Ohio Agricultural Experiment Station.

BULLETIN 84

—AND—

SIXTEENTH ANNUAL REPORT

FOR 1897.

WOOSTER, O., JULY 1, 1897.

The Bulletins of this Station are sent free to all residents of the State who request them. Persons who may receive duplicate copies, or who do not care to receive any, are requested to notify the Station. All correspondence should be addressed to

EXPERIMENT STATION, Wooster, Ohio.

NORWALK, OHIO.
THE LANING PRINTING COMPANY.
1897

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Sixteenth Annual Report

OF THE

Ohio Agricultural Experiment Station

For 1897.

Printed by Order of the State Legislature.

NORWALK OHIO:
THE LANING PRINTING COMPANY,
1897

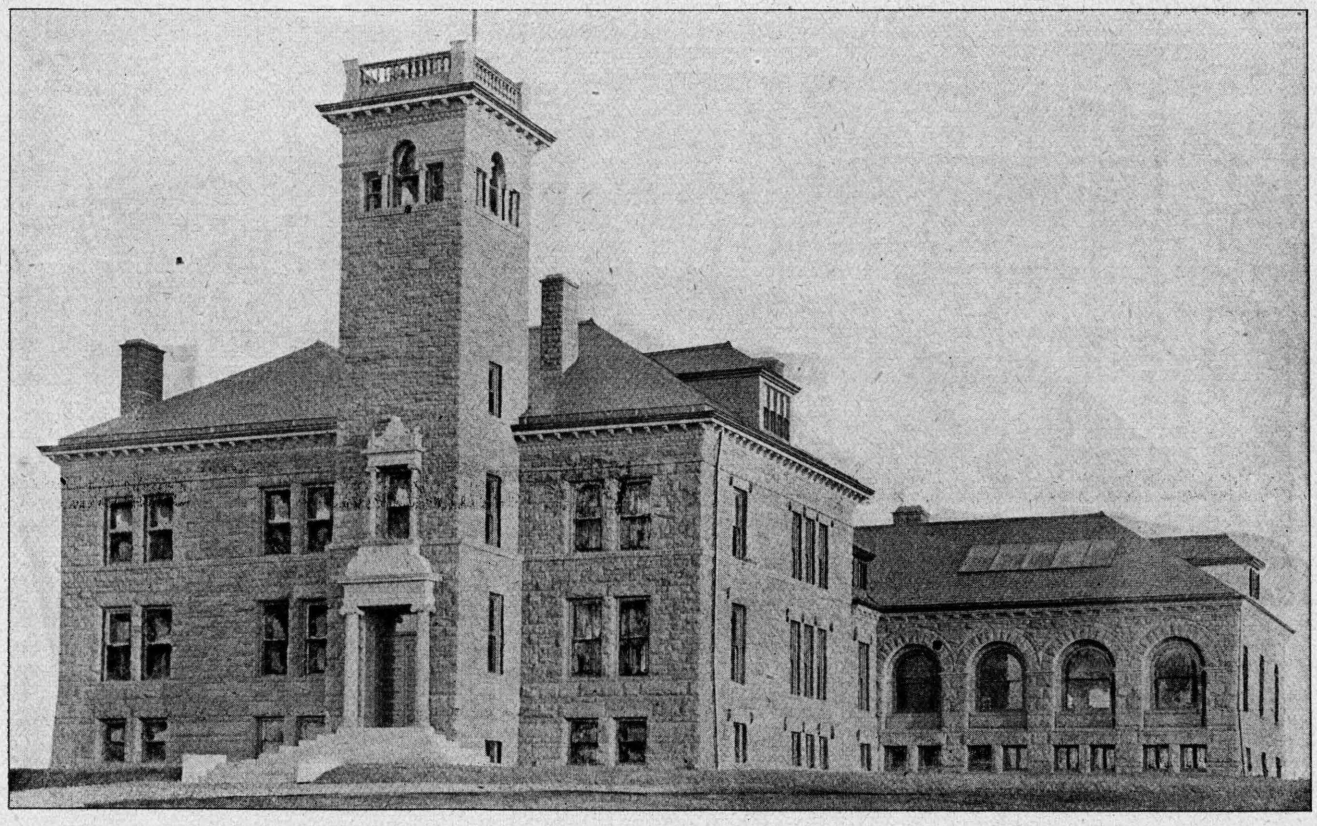
PUBLICATIONS OF THE OHIO EXPERIMENT STATION.

The first six annual reports of this Station, for the years 1882 to 1887, inclusive, contain the full record of its work during that period. Such bulletins as were published during these years ("first series") were intended for newspaper use; they were afterward incorporated in the annuals and no copies of the bulletins can now be furnished. The first and second annual reports are also out of print.

The "second series" of bulletins began with 1888. The first six of these were included in the seventh annual report, and cannot be furnished separately. The bulletins published since 1888 are listed below:

No. 8 (1889)—Insects, insecticides and methods of collecting and studying insects. *Out of print.*
No. 9 (1889)—Colic of horses. *Out of print.*
No. 10 (1889)—Silos and ensilage. Silage and field beets as food for cows.
No. 11 (1889)—Experiments with small fruits. Effect of early and late picking upon keeping quality of apples. *Out of print.*
No. 12 (1889)—Wheat: Cultural and variety tests. *Out of print.*
No. 13 (1889)—Insect remedies and prevention of potato rot.
No. 14 (1889)—Cabbage and cauliflower, and treatment of certain plant diseases. *Out of print.*
No. 15 (1889)—Annual report and meteorological summary.
No. 16 (1890)—Experiments with potatoes.
No. 17 (1890)—Field experiments with fertilizers.
No. 18 (1890)—Experiments with corn and oats. Actinomycosis.
No. 19 (1890)—Spraying to prevent insect injury. Insects affecting corn. Fungous diseases of plants. Collecting plants.
No. 20 (1890)—Corn silage vs. field beets as food for milk production.
No. 21 (1890)—Wheat: Cultural and variety tests.
No. 22 (1890)—Strawberries and raspberries.
No. 23 (1890)—The plum curculio, cucumber beetle, rhubarb curculio and clover stem borer. Potato blight.
No. 24 (1890)—Asparagus. Transplanting onions.
No. 25 (1890)—Grape rot and corn smut
No. 26 (1890)—Annual report and meteorological summary.
No. 27 (1891)—Corn: Cultural, variety and fertilizer tests.
No. 28 (1891)—Miscellaneous experiments in the control of injurious insects.
No. 29 (1891)—Fertilizers on wheat. *Out of print.*
No. 30 (1891)—Wheat: Cultural and variety tests and treatment for smut.
No. 31 (1891)—The wheat midge.
No. 32 (1891)—Experiments with small fruits. Diseases of the raspberry and blackberry
No. 33 (1891)—The Hessian fly. *Out of print.*
No. 34 (1891)—Forty years of wheat culture in Ohio.
No. 35 (1891)—Apple scab. The spraying of orchards. *Out of print.*
No. 36 (1891)—Annual report and meteorological summary.
No. 37 (1892)—Oats: Cultural and variety tests.
No. 38 (1892)—Mangel wurzels and sugar beets.
No. 39 (1892)—Fertilizers on corn and oats.
No. 40 (1892)—Insects which burrow in the stem of wheat.
No. 41—Not published.
No. 42 (1892)—Wheat: Cultural and variety tests.
No. 43 (1892)—Greenhouses and greenhouse work. The food of the robin.
No. 44 (1892)—The rusts of Ohio. Wild lettuce. Scab of wheat.
No. 45 (1892)—Insects affecting the blackberry and raspberry.
No 46 (1892)—Underground insect destroyers of the wheat plant.
No. 47 (1892)—Annual report and meteorological summary.
No. 48 (1893)—Profit in spraying orchards and vineyards.
No. 49 (1893)—Field experiments with fertilizers.
No. 50 (1893)—Experiments in feeding for milk.
No. 51 (1893)—Miscellaneous entomological papers.
No. 52 (1893)—Annual report and meteorological summary.
No. 53 (1894)—Field experiments with commercial fertilizers.
No. 54 (1894)—Strawberries. *Out of print.*
No. 55 (1894)—The Russian Thistle in Ohio.
No. 56 (1894)—The San José Scale.
No. 57 (1894)—Oats, variety and cultural experiments.
No. 58 (1894)—Thirteenth annual report and meteorological summary.
No. 59 (1895)—Noxious weeds along thoroughfares and their destruction.
No. 60 (1895)—Feeding for beef.
No. 61 (1895)—Sub-irrigation in the greenhouse.
No. 62 (1895)—The grape-root worm.
No. 63 (1895)—Orchard spraying and notes on varieties of raspberries.
No. 64 (1895)—The smut of oats.
No. 65 (1895)—Variety trials with potatoes.
No. 66 (1895)—Fourteenth annual report and meterological summary.
No. 67 (1896)—Oats: variety and cultural experiments; treatment for smut
No. 68 (1896)—Some destructive insects.
No. 69 (1896)—The Chinch bug.
No. 70 (1896)—Forage crops.
No. 71 (1896)—The maintenance of fertility.
No. 72 (1896)—Peach Yellows, Black Knot and San José Scale.
No. 73 (1896)—Investigations of plant diseases in forcing house and garden.
No. 74 (1896)—Meteorological summary and index.
No. 75 (1897)—Beet sugar production.
No. 76 (1897)—Potatoes: Cultural notes and variety and fertilizer tests.
No. 77 (1897)—The chinch bug and other destructive insects.
No. 78 (1897)—Corn; Cultural and variety tests and corn smut.
No. 79 (1897)—Some diseases of orchard and garden fruits.
No. 80 (1897)—The maintenance of fertility.
No. 81 (1897)—The San José Scale in Ohio.
No. 82 (1997)—Wheat: Cultural and variety tests.
No. 83 (1897)—A first Ohio weed manual.
No. 84 (1897)—Sixteenth annual report.

This Station has also published four bulletins in a "Technical Series," the first three numbers of which are devoted to entomological and botanical papers, the last to a list of the birds of Wayne county, Ohio.



Main Building. Ohio Agricultural Experiment Station.

Announcement.

The Ohio Agricultural Experiment Station is organized under an act of the General Assembly of Ohio, passed April 17, 1882, and supplemented by an act of Congress approved March 2, 1887.

The Station is prepared to test new varieties of grains, fruits and garden vegetables; to examine seeds that are suspected of being unsound or adulterated; to identify and name grasses, weeds and other plants; to identify insects and suggest measures for the control of such as are injurious, and to give advice concerning the prevention of the fungoid diseases which affect vegetation.

The Station is not prepared to furnish analyses of chemical or commercial fertilizers, as in Ohio that work is performed under direction of the Secretary of the State Board of Agriculture, at Columbus; but the Station will at all times respond to requests for advice concerning the use of such fertilizers.

The Station is not prepared to examine foods and dairy products suspected of adulteration, as that work is provided for in the Ohio Dairy and Food Commission, whose headquarters are at Columbus.

The Station is not at present prepared to offer advice or treatment for diseases of animals, but would refer all seeking such assistance to the Ohio Live Stock Commission, at Columbus.

Any citizen of Ohio has the right to apply to the Station for any information it can give, and all such applications will receive prompt attention.

Visitors to the Station are always welcome.

Address all communications to

EXPERIMENT STATION,
Wooster, Ohio.

ORGANIZATION OF THE

OHIO AGRICULTURAL EXPERIMENT STATION.

BOARD OF CONTROL.

SETH H. ELLIS	Springboro
R. H. WARDER	North Bend
J. T. ROBINSON	Rockaway
THE GOVERNOR OF THE STATE THE DIRECTOR OF THE STATION	*Ex officio*

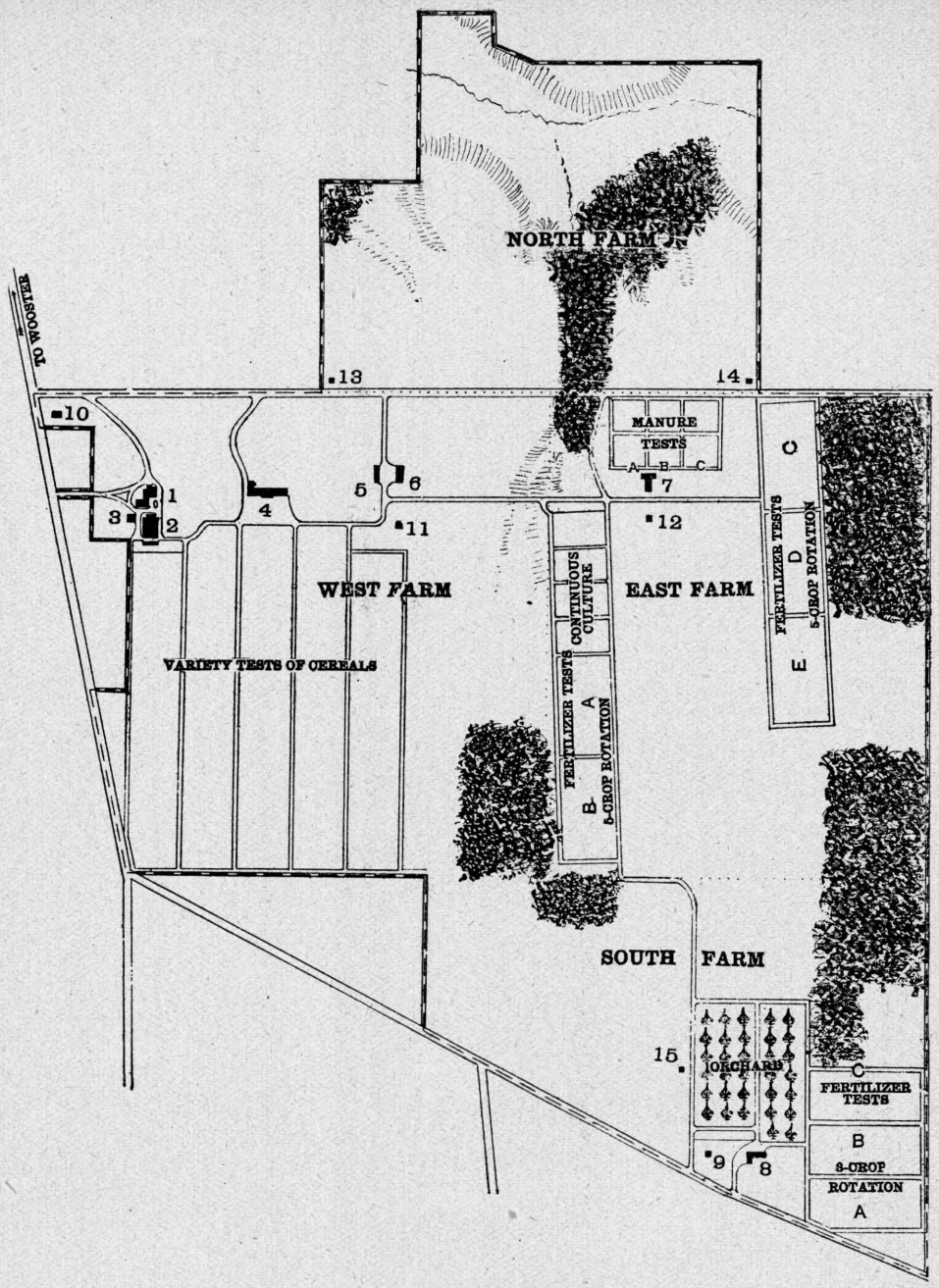
OFFICERS OF THE BOARD.

SETH H. ELLIS	President
R. H. WARDER	Secretary
PERCY A. HINMAN	Treasurer

STATION STAFF.

CHARLES E. THORNE	Wooster	Director
WILLIAM J. GREEN	"	Horticulturist and Vice-Director
J. FREMONT HICKMAN, M. A. S	"	Agriculturist
FRANCIS M. WEBSTER, M. S	"	Entomologist
AUGUSTINE D. SELBY, B. Sc.	"	Botanist and Chemist
LLOYD M. BLOOMFIELD, B. AGR	"	Assistant Chemist
CHARLES W. MALLY, M. Sc.	"	Assistant Entomologist
PERCY A. HINMAN	"	Bursar
WILLIAM HOLMES	"	Foreman of Farm
CHARLES A. PATTON	"	Ass't Foreman and Meteorologist
DELBERT A. CROWNER, B. Sc. AGR.	"	Dairyman
ANNIE B. AYRES	"	Mailing Clerk
S. J. BLAKE	"	Mechanic
W. E. BONTRAGER	"	Foreman of Greenhouses
EDWARD MOHN	Strongsville	Supt. Northeastern Sub-Station
W. A. PORTER	Cleveland	Salesman

The Bulletins of this Station are issued at irregular intervals. They are paged consecutively, and an index is included with the Annual Report, which constitutes the final number of each yearly volume.



FARM MAP—OHIO AGRICULTURAL EXPERIMENT STATION.

1. Main Building.
2. Green Houses.
3. Biological Laboratory.
4. Dairy Barn and Creamery
5. Tool House.
6. Horse Barn.
7. East Barn.
8. Horticultural Barn and Cold Storage.
9. Residence of Horticulturist.
10. Residence of Director.
11, 12, 13, 14, 15. Dwellings Occupied by Foremen and Laborers.

To His Excellency, ASA S. BUSHNELL, *Governor of Ohio:*

SIR: I have the honor to transmit herewith the sixteenth annual report of the Ohio Agricultural Experiment Station, for the fiscal year ending June 30, 1897.

R. H. WARDER, Secretary.

Report of the Treasurer.

To Hon. S. H. ELLIS, *President of the Board of Control:*

SIR: I respectfully submit herewith the financial report of this Station for the fiscal year ending June 30, 1897:

In Statements A, B, C and D, respectively, will be found a record of the receipts and expenditures from the various funds; Statement A being a statement of account with the annual appropriation received from the U. S. Treasury, and a copy of the report made to the Governor of the State and the Secretary of the U. S. Treasury; Statement B being a statement of account with the State Treasury; and Statement C showing the receipts from farm produce and other sales.

The three statements, A, B and C, are combined in Statement D, which shows the total income and expenditures for the fiscal year.

STATEMENT A.

THE OHIO AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH THE UNITED STATES APPROPRIATION, 1896-7.

Dr.

To receipts from the Treasurer of the United States as per appropriation for the fiscal year ending June 30, 1897, as per Act of Congress approved March 2, 1887	$15,000 00

Cr.

By Salaries	$12,200 58	
Labor	2,518 08	
Postage and stationery	7 39	
Seeds, plants and sundry supplies	155 02	
Fertilizers	27 60	
Library	43 77	
Tools, implements and machinery	37 56	
Contingent expenses	10 00	
Total	$15,000 00	$15,000 00

I, the undersigned, duly appointed Auditor of the Corporation, do hereby certify that I have examined the books and accounts of the Ohio Agricultural Experiment Station for the fiscal year ending June 30, 1897; that I have found the same well kept

and classified as above and that the receipts for the year from the Treasurer of the United States are shown to have been $15,000.00, and the corresponding disbursements $15,000.00; for all of which proper vouchers are on file and have been by me examined and found correct.

And I further certify that the expenditures have been solely for the purposes set forth in the Act of Congress approved March 2, 1887.

{ SEAL OF INSTITUTION }

Signed,
S. H. ELLIS,
Auditor of Board of Control.

Attest: Chas. E. Thorne, *Custodian.*

I hereby certify that the foregoing statement of account to which this is attached, is a true copy from the books of account of the institution named.

PERCY A. HINMAN,
Treasurer of Board of Control.

STATEMENT B.

OHIO AGRICULTURAL EXPERIMENT STATION IN ACCOUNT WITH THE STATE TREASURY.

Date of appropriation.	Appropriation for.	Total amount to the Station's credit.	Total amount expended.	Balance in treasury June 30, 1896.
1897.....	Expenses of Board of Control.....	$500 00	.....	$500 00
	Sub-stations for field experiments.	1,600 00	$1,222 93	377 07
	New construction	22,000 00	5,422 75	16,577 25
	Bulletin illustration.....	400 00	26 40	373 60
	Special work in entomology	1,000 00	73 38	926 62
	Special work in botany, horticulture and chemistry.....	1,400 00	247 15	1,152 85
	General repairs and supplies.....	2,500 00	1,961 27	538 73
	Totals for 1897.....	$29,400 00	$8,953 88	$20,446 12
	Balance of appropriations for 1895 and 1896 brought forward July 1, 1896.....	.....	.....	.....
1895.....	Expenses of Board of Control.....	439 33	272 18	167 15
1896.....	Sub-stations for field experiments	796 91	796 91	.....
	New construction.....	19,937 63	19,937 63	.....
	Bulletin illustration.....	121 08	121 08	.....
	Special work in entomology.....	994 17	994 17	.....
	Special work in botany, horticulture and chemistry	1,273 67	1,273 67	.....
	General repairs and supplies.....	472 70	472 70	.....
	Totals.....	$53,435 49	$32,822 22	$20,613 27

STATEMENT C.

MISCELLANEOUS RECEIPTS OF THE OHIO AGRICULTURAL EXPERIMNET STATION.

June 30, 1897, from sales of agricultural produce		$587 05
" " dairy produce		857 23
" " live stock		495 02
" " horticultural produce		1,101 37
" from labor		142 52
" " rents		921 22
" " miscellaneous sales		149 14
" " conducting tests of dairy cattle		22 00
" " chemical analyses		20 00
" " inspection of nurseries		35 40
" " Columbus sub-station, O. S. U.		31 26
" " North Western sub-station		91 27
" " North Eastern sub-station		113 58
Total receipts for the year		$4,567 06

STATEMENT D.

TOTAL RECEIPTS AND EXPENDITURES OF THE OHIO AGRICULTURAL EXPERIMENT STATION FOR THE YEAR ENDING JUNE 30, 1897.

Total receipts.

From U. S. Treasury	$15,000 00	
" state appropriations for 1897	29,400 00	
" miscellaneous receipts	4,567 06	
Total receipts for the year		$48,967 06
Total balance brought forward July 1, 1896		21,359 23
Total		**$70,326 29**

Total expenditures.

For salaries of technical and office staff		$11,010 00	
" temporary services		44 50	
" of foremen and skilled laborers	$3,531 08		
For ordinary labor	6,196 80		
Total labor		9,727 88	
For publications		250 03	
" postage and stationery		471 49	
" freight and express		504 20	
" heat, light and water		322 27	
" chemical supplies		74 89	
" seeds, plants and sundry supplies		1,141 92	
" fertilizers		188 29	
" feeding stuffs		362 38	
" library		111 04	
" tools, implements and machinery		287 69	
" scientific apparatus		148 41	
" live stock		40 00	
" traveling expenses		932 12	
" contingent expenses		451 40	
" building and repairs		25,911 91	
Total expenditures for the year			$51,980 42
By net balance carried forward			18,345 87
Total			$70,326 29

BUILDINGS AND IMPROVEMENTS.

During the fiscal year the following amounts have been expended for permanent improvements on the farm:

New buildings	$24,287 42	
Repairs on buildings	1,180 78	
Fruit trees	29 64	
Miscellaneous farm improvements	99 73	
Total		$25,597 57

Respectfully submitted,

PERCY A. HINMAN,
Treasurer.

Report of the Director.

HON. S. H. ELLIS, *President of the Board of Control.*

SIR: Under its State organization, the annual reports of the Ohio Agricultural Experiment Station were made to cover the calendar year. When reorganized under the National law it became necessary to make the financial report cover the National fiscal year, which ends June 30, but the remainder of the report was still made to include the calendar year, thus extending the general report six months beyond the termination of the financial report. At that time it was possible by this method to include most of the year's operations in a report issued during the winter following; but as the work has increased in magnitude the compilation of results has required more time, and this, together with the increased demand for help from the Station staff in farmers' institute work, has rendered it impossible to complete the work of compilation before the spring months; and when, therefore, the Director of the Office of Experiment Stations of the United States Department of Agriculture requested that, if possible, our general reports be made, like the financial reports, to coincide with the fiscal year, there seemed no good reason why we should not make the change.

With the approval of the Board of Control, therefore, this general report is made to cover the six months ending June 30, 1897, the Treasurer's report accompanying being, as heretofore, for the fiscal year ending on that date, while the bulletins which have been issued since our last annual report—Numbers 75 to 83 inclusive—all relate to work executed before the beginning of the present calendar year.

COMPLETION OF MAIN BUILDING.

The main or administration building was completed in May, according to contract, and was dedicated on June 3, with appropriate ceremonies. Addresses were delivered by His Excellency, Asa S. Bushnell, Governor of the State, by Hon. J. H. Brigham, National Assistant Secretary of Agriculture, by Dr. W. I. Chamberlain, L. L. D., Associate Editor of the Ohio Farmer and by Dr. E. W. Allen, Assistant Director of the Office of Experiment Stations, U. S. Department of Agriculture.

It is estimated that ten thousand people attended the exercises, for the success of which the Station is largely indebted to the hearty co-operation of the citizens of Wooster and Wayne county.

A stenographic report of the dedicatory addresses will be published as an appendix to the present report.

THE STATION'S WORK.

SUGAR BEET INVESTIGATIONS.

A very great interest has been excited in the minds of the farmers of Ohio and other states regarding the possibility of production of beet sugar in this region. During the winter the National Secretary of Agriculture distributed a large amount of sugar beet seed free to farmers who would undertake to cultivate the beets and furnish samples for analysis, several hundred pounds of seed being distributed in Ohio through the agency of the Secretary of the State Board of Agriculture.

Recognizing the possible importance of this industry, a bulletin, just issued by the Experiment Station of the University of Wisconsin (No. 55) was republished in January, with slight additions, as Bulletin 75 of this Station, and preparations are being made to determine the sugar content of such sample beets as may be sent to the Station for that purpose.

THE MAINTENANCE OF FERTILITY.

The study of fertility maintenance is being pursued upon lines laid down in our previous publications, and a bulletin (No. 80) has been prepared, giving the results of the work in 1896. The unfavorable seasons of 1895 and 1896 have materially affected the general results of this work, but as such seasons are always to be expected, any study of this problem which is to have practical value to the farmer must take them into consideration. The present indications are that the results for 1897 will be much more encouraging to the use of fertilizers, at least so far as the wheat crop is concerned, than have those of recent years.

EXPERIMENTS WITH CORN.

Bulletin 78, compiled by the Agriculturist, gives the results of the Station's experiments in corn for six seasons, earlier publication having been prevented by the extra work incidental to the removal of the Station and its re-establishment in a new location. While this delay in publication was not intentional, it nevertheless has some compensations, as by it variations due to seasonal and soil peculiarities have been largely eliminated, and results have been secured which are far more trustworthy than those of any single season can be. Among other experiments may be mentioned those in the selection of seed from different parts of the ear, which show conclusively that there is no marked difference in productiveness of such seed, even when selected from the same part for many generations; and the experiments in deep and shallow culture, which show decidedly better results from shallow cultivation.

EXPERIMENTS WITH WHEAT.

In a similar manner, Bulletin 82 collects the results of several years' cultural and variety tests with wheat. These tests extend over two seasons which take rank among the most unfavorable seasons for wheat ever known in Ohio, and for that reason their results must be considered as subject to considerable modification. They give, however, suggestions of value concerning varieties, methods of culture, and treatment for smut.

HORTICULTURAL WORK.

The horticultural work of the Station is being continued upon the plans outlined in the last report. Of the fruit crops for 1897, peaches and plums have been destroyed by the freezing of the buds in winter; our sprayed apple trees are overloaded, although there is a general failure of the apple crop in this section of Ohio, and small fruits have given an abundant crop.

Bulletin 76 reports the work of 1896 in this department with potatoes, including cultural and variety tests and a preliminary report on experiments with fertilizers, which is completed with revision in Bulletin 80.

This department is also represented in Bulletin 79, on "Some Diseases of Orchard and Garden Fruits," with spray calendar supplement; the calendar being prepared jointly by the Horticulturist, Entomologist and Botanist of the Station at the request of the State Horticultural Society.

INSECT CONTROL.

Bulletin 77 is a report on the destructive outbreaks of chinch bugs in Ohio in 1895 and 1896. The work done by the Station in attempting to control this insect was briefly outlined in our last annual report, and the hope was expressed there that it might be kept in check by means of the parasitic fungus distributed by the Station. This hope seems likely to be realized, for while there have been many reports of the appearance of chinch bugs this season in various parts of the state, they seem to have shown themselves chiefly or altogether in different regions from those previously affected, and in much smaller numbers than hitherto.

The advent of the San José scale has resulted in the enactment of laws in several states, which either require the inspection of nursery stock or render such inspection essential to the free shipment of such stock from state to state. Because of this legislation in other states and on account of lack of definite provision for such inspection in Ohio many nurserymen of the State have requested the Entomologist of the Station to inspect their nurseries and certify when possible to their freedom from

this insect. In compliance with these requests the Entomologist visited a number of nurseries during the late winter and early spring months, giving certificates of inspection in most cases. As this work is done chiefly for private benefit and cannot be classed as scientific investigation, a charge has been made for these certificates, sufficient to cover the cost of travel, and the money thus collected has been turned into the Station treasury.

WEEDS AND PLANT DISEASES.

Attention is apparently being directed more generally than ever before to the subject of plant diseases, judging from the number of applications received from Township Clerks for the special bulletin (No. 72) published by order of the last General Assembly.

The contagiousness of some of the most destructive of these diseases has been abundantly demonstrated, as has also the fact that they may be kept under control—some of them quite easily—by methods based upon a correct understanding of their nature. But such is the carelessness of the average individual that there are certain to be some in every neighborhood who will continue to propagate and spread plant diseases amongst their neighbors' crops unless compelled to desist.

The Black-knot-yellows law is a step in the right direction; but it would seem that the time had come to extend its operations so as to prevent the dissemination of nursery stock infected with these and other equally destructive diseases or parasites, notably the crown gall, a pest which appears to be increasing in frequency and destructiveness and to affect most varieties of fruits.

The State weed laws urgently need revision. As they stand now the destruction of "Canada or Russian thistles, wild lettuce and wild mustard" is made obligatory. By wild lettuce it is probable that prickly lettuce, (*Lactuca Scariola*, L.) was meant; but the common name "wild lettuce" is applied, not to this plant, but to the comparatively harmless *Lactuca Canadensis*. This point illustrates the necessity for consulting experts in preparing laws of this character.

The work of the Station's Botanist has been divided between the investigation of plant diseases, a preliminary report of which is made in Bulletin 79, and the study of the weedy plants of the state, a bulletin on which topic (No. 83) is now in course of publication, and the general supervision of the Station's chemical work.

The Assistant Chemist has been occupied with the analysis of the soils of the Station farm and of the materials used in the Station's feeding experiments. He is also Director of the Agricultural Students' Union of Ohio, a group of young farmers who are conducting a series of agricultural and horticultural experiments in co-operation with the Experiment Station and the State University.

BULLETINS.

Ten bulletins of the regular series are included in the present volume, namely:

No. 75. Beet sugar production. A reprint of Bulletin 55 of the Agricultural Experiment Station of the University of Wisconsin: pp. 1-32.

No. 76. Potatoes. Cultural notes, variety tests and experiments with fertilizers. pp. 34-48.

No. 77. The chinch bug and other destructive insects. pp. 34-52*

No. 78. Corn. Cultural investigations, comparison of varieties, corn smut. pp. 53-96.

No. 79. Some diseases of orchard and garden fruits, with spray calendar supplement, pp. 98-141.

No. 80. The maintenance of fertility. Field experiments with fertilizers. pp. 143-175.

No. 81. The San José Scale in Ohio. pp. 179-212.

No. 82. Field experiments with wheat. Comparison of varieties and cultural investigations. pp. 213-235.

No. 83. A first Ohio weed manual. General consideration and descriptive illustrated list of Ohio weeds. pp. 236-400.

No. 84 Sixteenth annual report for 1896-7.

Bulletins No. 166 to 174 inclusive, of the newspaper series, belong to this volume.

The past publications of the Station are listed in Bulletins 52, 66 and 74.

*Paging duplicated by error of the printer.

ACKNOWLEDGMENTS.

BOOKS AND PAMPHLETS.

Through the Office of Experiment Stations, U. S. Department of Agriculture, this Station has recently received a set of the ROTHAMSTED MEMOIRS, comprising nine volumes, bound in full Russia and donated by Sir John B. Lawes. These memoirs contain the published work of Sir John B. Lawes and Sir J. Henry Gilbert, whose more than half a century of continuous work together has made the name of Rothamsted synonymous with all that is highest in agricultural research.

Thanks are also returned for the following contributions, some of which should have been acknowledged at an earlier date:

Eleventh Census of the United States, complete report, from Hon. John Sherman. 28 volumes thus far received.

Transactions of the Montgomery County Horticultural Society, 1871 to 1895. A rare volume, containing the record of a quarter century's work of this society during which period not a single one of its monthly meetings was passed. Presented by the Secretary, William Ramsey, in concurrence with the President, N. Ohmer and the Vice President, Hon. N. H. Albaugh.

Thomas' American Fruit Culturist. New and revised edition, from William Wood & Co., Publishers, New York City.

Board of Agriculture, (London, England). Annual reports on the distribution of grants for agricultural education.

Agronomic Institute of the State of Sao Paulo, Brazil, (F. W. Dafert, Director, Campinas.) Annual Reports, 1889-1895, 6 volumes. (Spanish).

Imperial University of Japan, (Komaba, Tokyo), Bulletin of the College of Agriculture.

National Society of Agriculture of Chili, (Monjitas) Bulletin. (Spanish).

Department of Agriculture of Ontario, Canada, (Ottawa): Annual Reports, 1890 to 1895, 9 volumes, bound; also, separate reports of the Agricultural College and the various agricultural associations.

Meteorological Observatory of Mexico, (Mexico): Monthly meteorological bulletin and Bulletin of Agriculture, Mines and Industries (Spanish).

Department of Agriculture of New South Wales, (Sydney N. S. W. Australia): Annual Reports of the Department of Agriculture and Forests; Agricultural Gazette of New South Wales (monthly); Botanical publications by J. H. Maiden, Government Botanist, and Annual Report of the Hawkesbury Agricultural College and Experiment Farm, Richmond.

Department of Agriculture, Queensland, Australia (Brisbane): Annual Reports, 1889 to 1895, 6 volumes, and "Australian Fungi," by C. A. McAlpine.

Department of Agriculture of South Australia (Adelaide). Annual Report of the Department of Agriculture, 1895-6, Journal of the Bureau of Agriculture (Monthly) and miscellaneous bulletins.

Department of Agriculture of Victoria (Melbourne, Victoria, Australia) Systematic arrangement of Australian fungi, together with host index and list of works on the subject, by D. McAlpine, Government Vegetable Pathologist.

University College of North Wales, Agricultural Department (Bangor, Wales): Report on field experiments for the year 1896. (English and Welsh).

Sixth and seventh anuual reports of the work of the Halle Experiment Station for Nematode Destruction and Plant Protection, 1894 and 1895. (Dr. M. Hollrung, Director, Halle, Saxony, Prussia). (German.)

Journal of Plant Diseases for 1895 and 1896, from Dr. J. Ritzema Bos, Director of the Phytopathological Laboratory ef the Willie Commelin School, Amsterdam, Holland. Also reports from the laboratory, by the Director (Hollands).

Agricultural and Horticultural Society of the Island of Jersey. Annual Reports, from A. Balleine.

American Museum of Natural History, (Central Park, N. Y.) Bulletins.

Chicago Academy of Science (Chicago, Ills.): Bulletin No. 2, The Pleistocene Features and Deposits of the Chicago Area, by F. Leverett, U. S. Geological Survey.

Cincinnati Society of Natural History (Cincinnati, O.): Transactions.

Columbus Horticultural Society (Columbus, O.): Journal. Bound.

Harvard University (Cambridge, Mass): Bulletin of the Bussey Institution.

Iowa Academy of Science (Herbert Osborne, Secretary, Ames, Iowa). Transactions.

Iowa State Dairy Commission (W. K. Boardman, Commissioner, Des Moines, Iowa): Annual Report for 1895, bound.

State University of Iowa (Iowa City): Bulletins from the Laboratories of Natural History.

Kansas Academy of Science (B. B. Smyth, Librarian, Topeka): Transactions, Vol. XIV, bound.

Kansas State Board of Agriculture (F. D. Coburn, Secretary, Topeka): Biennial Reports, 1893-1896, 2 volumes, bound, and quarterly reports.

Kansas State Historical Society (F. G. Adams, Secretary, Topeka): Historical Collections, Vol. 4, bound.

Bureau of Agriculture of the State of Louisiana (H. C. Newson, Commissioner, Baton Rouge): Biennial Report, Vol. VI, 1896, bound.

Maine State Board of Health (A. G. Young, M. D., Secretary, Augusta): Ninth Report for 1894-5, bound.

Maine Registration Report (A. G. Young, M. D., Registrar, Augusta): Second Annual Report for 1893, bound.

Massachusetts Board of Agriculture (Wm. R. Sessions, Secretary, Boston): Annual reports, 1884 and 1888 to 1896, and special report on the Gypsy moth, 1896, 12 volumes, bound.

Massachusetts Dairy Bureau (Geo. M. Whitaker, Acting Executive Officer, Boston): The Milk Supply of Massachusetts Cities.

Michigan Board of Agriculture (I. H. Butterfield, Secretary, Agricultural College P. O): Annual Reports, 1873 to 1895, 21 volumes, bound.

Michigan Weather Service (C. F. Schneider, Lansing, Director): Annual Report for 1895, bound.

Minnesota Botanical Studies (Conway MacMillan, State Botanist): Parts 1 to 11 of Bulletin No. 9 of the Geological and Natural History Survey of Minnesota.

Minnesota Farmers' Institutes. Annual Reports, from O. C. Gregg, Superintendent, Lynd, Minn.

Missouri Botanical Garden (Prof. Wm. Trelease, Director, St. Louis, Mo.): Annual Reports, 1893 to 1897, 5 volumes, bound.

National Stockman and Farmer: File of bound volumes, from the Axtell-Rush Publishing Co., publishers, Pittsburg, Pa.

National Academy of Sciences (Washington, D. C.): Memoirs, Vol. VII. By courtesy of A. S. Packard, M. D.

New Hampshire Board of Agriculture (N. J. Bachelder, Secretary, Concord): Annual Report, 1894, bound.

New York Academy of Medicine (John S. Brownne, Resident Librarian, New York City): Transactions, Vols. 3 to 10 inclusive.

New York Botanical Garden (N. L. Britton, Director in Chief, New York City): Bulletins.

New York State Department of Agriculture (Fred. C. Schraub, 1895, and C. A. Wieting, 1896, Commissioners, Albany): Annual Reports 1895 and 1896, 5 volumes, bound.

New York State Entomologist (Dr. J. A. Lintner, Albany): Annual Reports, 1 to 11. Partly bound.

University of the State of New York (Melvil Dewey, M. A., Secretary, Albany): State Library Bulletins on State Legislation, 1892 to 1896.

New York Farmers, the (Thomas Sturgis, Secretary, New York City): Proceedings, 1894 to 1897.

Oberlin College (Oberlin, O.): Laboratory Bulletins and Bulletins of the Wilson Ornithological Chapter of the Agassiz Association.

Standard Cattle Co. (R. M. Allen, General Manager, Ames, Neb.): Pamphlets on cattle feeding, sugar beets and corn crops.

University of Pennsylvania (Philadelphia, Pa.): Contributions from the Botanical Laboratory, Vol. 1, No. 3.

Virginia State Board of Agriculture (Thomas Whitehead, Secretary, Richmond): Report for 1896, bound.

West Virginia State Board of Agriculture (C. C. Brown, Secretary, Charleston): Third Biennial Report for 1895–1896, bound.

Wisconsin Academy of Sciences, Arts and Letters (Chas. R. Barnes, Secretary, University of Wisconsin, Madison): Transactions, Vols. 8, 9 and 10. 1888 to 1895.

Wisconsin Farmers' Institutes. Annual Reports, from Geo. McKerrow, Superintendent, Madison.

We take pleasure in acknowledging the frequent receipt of publications from the U. S. National Department of Agriculture and of bulletins from the Experiment Stations of other States and the Canadian Provinces.

PERIODICALS.

Our thanks are returned to the publishers of the following journals, which are being regularly received at the Station in exchange for our bulletins:

AGRICULTURAL AND TRADE JOURNALS.

Acker und Gartenbau Zeitung, Milwaukee, Wis.
Agricultural Epitomist, Indianapolis, Ind.
Agricultural Gazette, New South Wales.
Agricultural Student, Columbns, O.
American Agriculturist, New York, N. Y.
American Grange Bulletin, Cincinnati, Ohio.
California Cultivator and Poultry Keeper, Los Angeles, Cal.
Campbell's Soil Culture, Sioux Ciry, Iowa,
Canadian Entomologist, London, Ontario, Canada.
Cincinnati Price Current, Cincinnati, Ohio.
Colman's Rural World, St. Louis, Mo.
Cultivator, Omaha, Neb.
Dakota Farmer, Huron, South Dakota.
Dorset Quarterly, Washington, Pa.
Elgin Dairy, Elgin, Ill.

Farm and Fireside, Springfield, Ohio,
Farm and Home, Springfield, Mass., and Chicago, Ill.
Farmer's Advocate, London and Winnepeg, Canada.
Farmer's Guide, Huntington, Ind.
Farmer's Home, Dayton, Ohio.
Farmer's Magazine, Springfield, Ill.
Farmer's Voice, Chicago, Ill.
Farm, Field and Fireside, Chicago, Ill,
Farm Journal, Philadelphia, Pa.
Farm, Stock and Home, Minneapolis, Minn.
Forester, The, Princeton, N. J.
Fruit Growers' Journal, Cobden. Ill.
Gardening, Chicago, Ill.
Gentleman Farmer, Chicago, Ill.
Gleanings in Bee Culture, Medina, Ohio.
Green's Fruit Grower, Rochester, N. Y.
Hoard's Dairyman. Ft. Atkinson, Wis.
Homestead, The, Des Moines, Iowa.
Hospodar, (Bohemian), Omaha, Neb.
Industrial American, Lexington, Ky.
Indiana Farmer, Indianapolis, Ind.
Jersey Bulletin, Indianapolis, Ind.
Journal of Agriculture, Adelaide, South Australia.
Journal of Agriculture, St. Louis, Mo.
Market Garden, The, Minneapolis, Minn.
Mirror and Farmer, Manchester, N. H.
Montana Fruit Grower, Missoula, Mont.
National Provisioner, New York, N. Y,
National Stockman and Farmer, Pittsburg, Pa.
Ohio Farmer, Cleveland, Ohio.
Oregon Agriculturist, Portland, Oregon.
Pacific Coast Dairyman, Tacoma, Wash.
Practical Dairyman, Chatham, N. Y.
Practical Farmer, Philadelphia, Pa.
Prairie Farmer, Chicago, Ill.
Progressive South, Richmond, Va.
Rural Northwest, Portland, Oregon.
Southern States, Baltimore, Md.
Sugar Beet, The, Philadelphia, Pa.
Tri-State Farm News, Toledo, Ohio.
West Virginia Farm Reporter, Charleston, W. Va.

GENERAL NEWSPAPERS.

FROM OHIO.

Columbus Record, Columbus.
Cortland Herald, Cortland.
Crawford County News, Bucyrus.
Democrat, The, Pomeroy.
Democratic Herald, Delaware,
Fremont Journal, Fremont.
Greenville Democrat, Greenville.
Graphic News, The, Kenton.
Jacksonian, The, Wooster.

Monroe Journal, (German) Woodsfield.
Ohio State Journal, Columbus.
Shelby Times, Shelby.
Tuscarawas Chronicle, Uhrichsville and Dennison.
Wayne County Herald, Wooster.

FROM OTHER STATES.

Baltimore Weekly Sun, Baltimore, Md.
Detroit Free Press, Detroit, Mich.
Kansas Semi-Weekly Capital, Topeka, Kan.
Public Ledger (Daily) Philadelphia, Pa.
Salt Lake Herald, Salt Lake City, Utah.
Union, The Weekly, Manchester. N. H.
World, The Weekly, New York, N. Y.
World-Herald, The Weekly, Omaha, Neb.

PLANTS, SEEDS, ETC.

The Station is under obligations to the following named persons for donations of plants, seeds, etc., and for other favors:

Albertson & Hobbs, Bridgeport, Ind., Pomona Currant plants.
Arrington, H. H., Summerville, Ga., variety potatoes.
Aultfather, H. H., Minerva, O., Apples and apple cions.
Austin, J. D., Pilot Point, Texas, dewberry plants.
Baumgardner, G. D., Lancaster, O., 1 variety strawberry plants.
Beauoy, Lon, Matthews, Ind., 2 varieties strawberry plants.
Beebe, Geo., Lakeside, O., diseased peach trees for study.
Berry, P. D., Dayton, O., 2 varieties strawberry plants.
Boschen, Jno., Gypsum, O., diseased peach trees.
Botanic Gardens, Sydney, New South Wales, J. H. Maiden, Director, seeds of 13 species Australian grasses and forage plants.
Brown, Le Roy & Sons, Clyde, O., 2 varieties strawberry plants.
Burpee, W. A & Co., Philadelphia, Pa., 35 packets seeds.
Cox, Nelson, Ensee, O., diseased peach trees.
Crane, C. G., Creston, O., special samples of sugar beets.
Crane, Dr. W. W., Tippecanoe City, O., the same.
Crawford, M., Cuyahoga Falls, O., 1 variety blackberry plants.
Demesmay, F., Cysong, (Nord) France, sugar beet seeds.
Earhart, W. H., Lexington, O., 3 varieties peach trees.
Frayer, D. O., Greenwich, O., 1 variety potato.
Fulton, W. B., Kirkwood, O., diseased celery plants.
Gable, Henry, Lattasburg, O., 1 variety each, raspberry and strawberry.
German Kali Works, 93–97 Nassau Street, N. Y. City, 800 lbs. muriate of potash and numerous publications.
Gregory, J. J. H. & Son, Marblehead, Mass., 1 variety pea.
Good, Albert, Wooster, O., 1 box insects.
Harrington, E. F., Malden, Mass., 1 variety potato.
Heller, Daniel, Wooster, O., 1 variety seed oats.
Jordan Bros. & Co., Creston, O., diseased celery plants.
Josselyn, George S., Fredonia, N. Y., 1 variety grape.
Lumsden, B. D., Macon, Ga., seeds from Russia.
Mace, George W., Greenville, O., 1 variety potato.
Manum, A. E., Bristol, Vt., 1 variety potato.

Marsh, H. C., Muncie, Ind., 1 variety potato.
Merchant, M. E., Guilford, N. Y., diseased plants.
New York Agricultural Experiment Station, Geneva, N. Y., apples and cions.
Noland, J. P., Peninsula, O., 1 variety strawberry.
Northwestern Seed Co., Dundee, Minn., 7 packets seeds.
Notestein, J. B., Canaan, O., special samples of sugar beets.
Pratt, C. S., Reading, Mass., 1 variety strawberry.
Read, L. H., Grand Rapids, Wis., 3 varieties potatoes and squash seeds.
Rennie, Dr. J. G., Inspector U. S. Bureau Animal Industry, Kansas City, Mo., Museum specimens from stock yards.
Rural New Yorker, N. Y. City, 1 variety potato.
Salmon, Dr. D. E., Chief U. S. Bureau of Animal Industry, 2 lots tuberculin.
Shaw, J. W., Minerva, O., apple cions.
Sheets, U. G., Rittman, O., special samples sugar beets.
Shockey, H. W., Donnellsville, O., 1 variety strawberry.
Sterling, C. C., Grand Rapids, O., plum and peach trees.
Teas, E. Y., Irvington, Ind., 2 varieties weeping mulberry.
Thomas Hhosphate Syndicate, Cologne, Prussia, several hundred pounds of Thomas Phosphate Powder for use of Student's Union.
Thurston, Azor, Grand Rapids, O., special samples sugar beets.
United States Department of Agriculture, Washington, D. C., seeds, plants, publications and many favors.

PERSONNEL.

No change was made in the personnel of the Station during the period covered by this report, except that in May, W. A. Porter was transferred from the position of Florist to that of Salesman, and located in Cleveland for the purpose of attending to the disposal of the Station's produce.

Respectfully submitted,

CHAS. E. THORNE.
Director.

APPENDIX A.

ADDRESSES

DELIVERED AT THE DEDICATION OF THE

ADMINISTRATION BUILDING

OF THE

OHIO AGRICULTURAL EXPERIMENT STATION,

ON

THURSDAY, JUNE 3, 1897.

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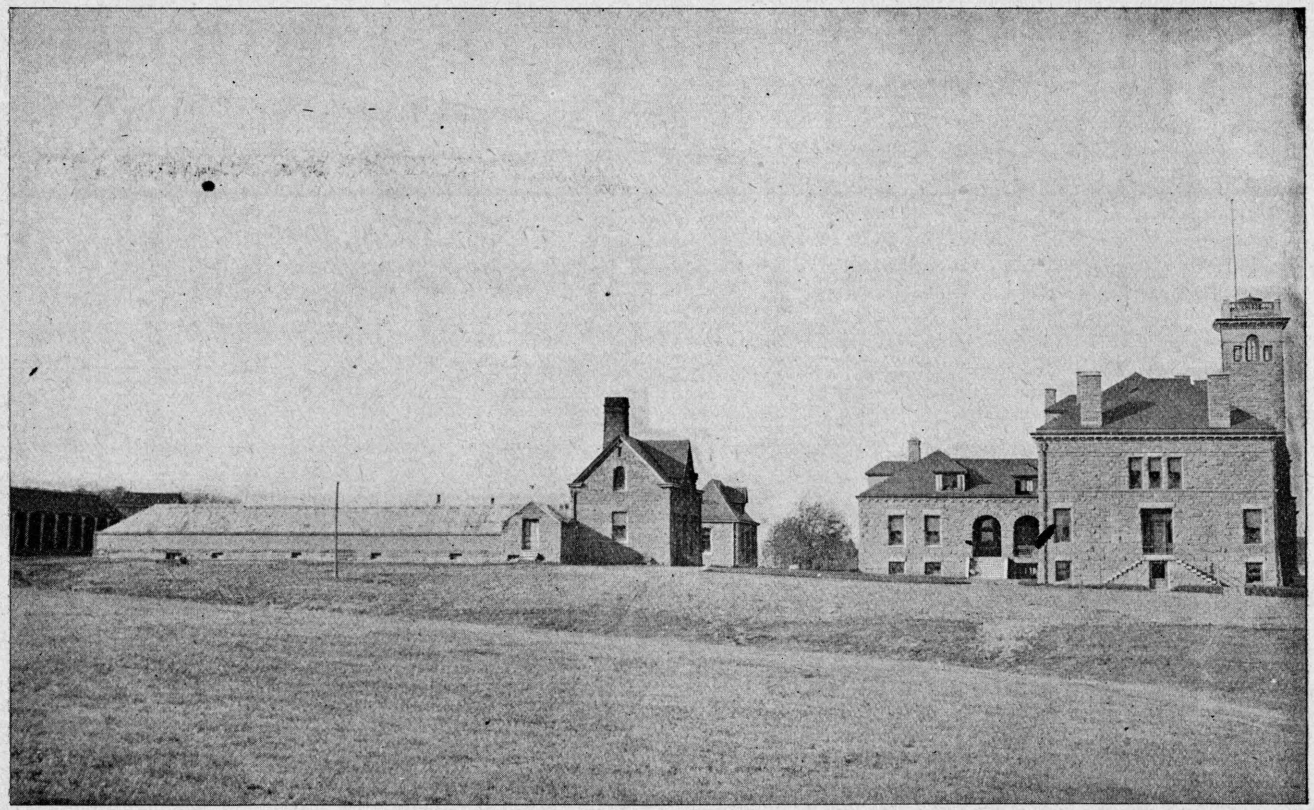

Greenhouses and Main Building of the Ohio Agricultural Experiment Station. East Front

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Introduction.

BY THE DIRECTOR.

The Ohio Agricultural Experiment Station was established by an act of the State Legislature, introduced by Hon. J. H. Brigham, then member of the State Senate, and passed April 17, 1882. This act has since been slightly amended and now stands as Sections 7447 to 7452 of the Revised Statutes of the State.

This act placed the location and control of the Station in the hands of a Board of Control, consisting of the Governor of the State, three members appointed by him and the person whom the Board should appoint as Director of the Station.

It was expected, when the law was passed, that the Station would be located, temporarily at least, on the lands of the Ohio State University in Columbus, and this expectation was realized in a mutual agreement between the Board of Trustees of the University and the Board of Control of the Station, by which about 30 acres of the University farm were assigned to the use of the Station, and the latter immediately began its work, under the directorship of W. R. Lazenby, Professor of Horticulture at the State University.

In 1888 the Station was reorganized under the national experiment station law, known as the Hatch Act*, passed the previous year, and a larger area of the University farm, comprising practically all its tillable land, was turned over to the Station.

This farm is located entirely within the corporate limits of the City of Columbus. At the time the transfer to the station was made the city had not begun to encroach upon it, although it was rapidly moving towards it on three sides; but two years later it became apparent that the farm was not only unsuited to the work of an agricultural experiment station, but that it must eventually be given over to other uses than agriculture, as shown by the following extract from the report of the Director of the Station for 1890.

"The farm belonging to the Ohio State University contains nearly 340 acres of land. That portion occupied by the Experiment Station lies chiefly west of Neil avenue and comprises about 205 acres of land, but this includes the main and secondary channels of the Olentangy river, which cover not less than 40 acres. The west bank of the Olentangy is the boundary line of the farm, so that its entire channel, about 16 rods wide by 200 rods long, together with secondary channels of equal area, are included within the farm boundaries. The area actually occupied by the Station does not, therefore, exceed 165 acres. Of this area about 100 acres is what is known as first bottom, and is subject to overflow. The remainder lies 15 to 30 feet above the bottom plain. The attempt has been made to guard the bottom land from overflow by

*For full text of the Hatch Act see the Annual Report of the Ohio Agricultural Experiment Station, for 1888, p. 205.

means of dikes; but these were broken in February last, and the bottom was nearly or entirely covered with water at three different times during the season. It goes without saying that these overflows have very seriously interfered with the Station's work. Some experiments were utterly destroyed and nearly all of those located in the bottom were so disturbed that we cannot place full confidence in the results.

The dikes are still down. It is estimated that to repair them and put them in such condition as to prove an effectual barrier against the river would cost about ten thousand dollars—a sum far beyond the resources of the Station. This sum would be sufficient to purchase outright a farm of 200 acres, located above overflow.

At some time the dikes will be repaired, for the land which they inclose is far too valuable to be abandoned to the river. Its value, however, lies in its adaptation to other purposes than agriculture.

The entire farm lies within the corporate limits of the city of Columbus. The lands adjoining it on all sides are being cut up and sold for building lots, at prices reaching into thousands of dollars per acre. The streets forming the north and south boundaries of the eastern portion of the farm have been paved with asphalt during the past season. In response to a very strong outside pressure, the University trustees have ordered the opening of Neil avenue through the center of the farm. A great sewer is now being constructed throughout the entire length of the farm, on the portion occupied by the Station, in which work a strip of land five or six rods wide by more than two hundred rods long, running diagonally through the bottom, has been rendered useless for experiment work by the upheaval of the underlying gravel and the trampling of teams in hauling material. Other sewers are to follow, and thus it has become so evident that no one can fail to see it, that the farm can be used for agriculture but a very few years longer.

But the work of an experiment station is work that requires years for its fruition. The great field experiments of Sir John B. Lawes have now been in progress nearly fifty years, but so far is he from regarding them as completed that he has set aside half a million dollars as an endowment for their perpetual continuance. The fact is that the field experiments of a single season have very little value in themselves. It is only as such tests are multiplied that their results become trustworthy guides to the farmer. Moreover, the most important lines of this work must be continued *year after year on the same soil* in order to be of any lasting value. The Rothamsted experiments on soil fertility, already alluded to, would have been worth but little had they been carried on for a few years here, then a few years there, shifting from place to place. It is their permanent character and the persistency with which the same question has been asked of the same soil year after year that has given to them a value beyond all computation.

For the reasons given above the Board of Control requested the legislature to authorize the removal of the Station, and this authority was given in an act empowering the various counties of the state to raise funds by special taxation, such taxation to be approved by a majority vote of the people of the county, and the funds to be donated to the Station for the purpose of securing its location within the county and to be expended in the purchase of land and the erection of buildings for its use.*

Under the provisions of this act the Commissioners of Wayne County offered the Station $85,000, on condition of its location within the county, and this offer was ratified, at a special election held for the purpose on the 6th of October, 1891, by a large majority of the votes cast. The bonds of the county were immediately executed and sold; the proceeds were

*For full text of this law, see Annual Report, O. A. E. S. for 1891, p. V.

deposited in the State treasury, and the Board of Control selected and purchased three adjoining farms, lying near the city of Wooster, and commenced the erection of a block of greenhouses and a small biological laboratory.

At this point a dissatisfied citizen of Wayne county instituted proceedings to test the constitutionality of the law under which the county had bonded itself to secure the location of the Station. In the Common Pleas and Circuit Courts the law was held good, but it was declared unconstitutional by a majority of the Supreme Court, on the ground that it taxed the people of a part of the state for the support of an institution controlled wholly by a board appointed by the Governor, and the work of which was executed for the benefit of the people at large; the court holding that no incidental benefits to the property in the neighborhood of the institution could justify any extra taxation on such property to secure its location.*

The land bought for the use of the Station had been paid for before the courts had acted upon this question, but on the promulgation of the decision of the Supreme Court the Auditor and Treasurer of State refused to honor the requisitions of the Board of Control upon the balance of the Wayne county donation, left in the state treasury, (amounting to over twenty-six thousand dollars) and the Board of Control was thus left without the means with which to pay for the buildings, the erection of which was under way. The contractors, however, completed their work according to agreement.

By a special resolution, passed March 1st, 1893, the legislature directed the State Auditor and Treasurer to release this fund, and April 25, 1894, an act was passed under which the bonds issued by Wayne county for the location of the Station were redeemed by the state.

At the sessions of 1894, 1895 and 1896, appropriations were made for the construction of several of the buildings required for the Station's work. The first building planned for the new home of the Station had been its main building, and because of the fact that the loss of an experiment station's records and collections may be one which cannot be replaced, it was decided that this building should be of fireproof construction.

To build in this manner required more money than the Board of Control could command at that time, and hence it was decided to commence building the less expensive structures and let the main building wait until sufficient funds should be appropriated to build it properly. The litigation which followed caused this delay to be extended far beyond the time anticipated, and much inconvenience was suffered in consequence, but the appropriations of 1895 and 1896 enabled the Board to carry out the original plan, and the building was completed in May, 1897.

*For a syllabus of this decision see Annual Report, O. A. E. S. for 1892, p. VIII.

This building was erected by Thomas G. Stence, of Ashland, and Samuel Ames, of Wooster, the same contractors who erected the first buildings referred to, during the litigation concerning the validity of the bonds. The Board of Control take pleasure in testifying to the thoroughness with which these gentlemen have fulfilled their contracts, even when working under very discouraging circumstances.

On the completion of the main building it was dedicated with appropriate ceremonies, in the preparation for which the citizens of Wooster and Wayne county took an active part. These ceremonies took place on Thursday, June 3rd, and were inaugurated by a procession from the city of Wooster to the Station grounds, led by the Governor of the State and members of his staff, accompanied by a volunteer escort of two batallions of the Ohio National Guard, who were followed by several thousand citizens in carriages, the total number in attendance being conservatively estimated at ten thousand.

The President of the Board of Control of the Station, Hon. S. H. Ellis, acting as President of the Day, conducted the dedicatory exercises proper, which consisted of prayer by Sylvester F. Scovel, D. D., president of the University of Wooster, and addresses by His Excellency, Asa S. Bushnell, Governor of the State; Hon. J. H. Brigham, Assistant U. S. Secretary of Agriculture; Dr. W. I. Chamberlain, Associate Editor of the *Ohio Farmer*, and Dr. E. W. Allen, Assistant Director of the office of Experiment Stations, U. S. Department of Agriculture. These addresses were followed by a banquet, given by citizens of Wooster, at which toasts were responded to by the Governor and Messrs. Brigham and Chamberlain, and by Hon. A. Boxwell, Ex-Speaker of the House of Representatives, General Assembly of Ohio: Hon. Jno. A. McDowell, of Millersburg, Member of Congress, and Col. C. V. Hard, of Wooster, the Toastmaster being A. D. Metz, Esq., of Wooster. These addresses are published in the following pages:

ADDRESS BY GOVERNOR ASA S. BUSHNELL.

Ladies and Gentlemen: I shall detain you only for a few words of greeting and congratulation. I know that some of you are, to a certain extent, uncomfortable in your position, and it would not be fair for me to detain you at any great length. I want to tell you what a pleasure it is to me to be here with you to-day. I like to meet the business men of your city, and other cities of our state and artisans as well, but there are no people in the world that I would rather meet than the farmers of Wayne county, of the great commonwealth of Ohio. (Applause.) You are here in large number to-day, and I know that you are here because of your interest in this splendid educational institution that the state and national government furnishes for your benefit, and that you are indebted and the state is indebted, to some extent, to the generosity of the people of Wayne county for this magnifi-

cent farm. Here we have as beautiful a view, I think, as there is on God's footstool, looking out, as we do, to that splendid city lying there in the valley, and over on the other ridge to a magnificent educational institution. There the time and the effort is devoted to the education of the mind; here it is to the education of the hands and arms and the strength of the farmers and those who follow in that calling. With two such grand educational institutions so situated that one may see the other as he looks out from the buildings of either you are certainly to be congratulated that you have them here in this fair county. It is said that "he who makes two blades of grass to grow where but one grew before is a benefactor to his race." That is what these gentlemen who have charge of this farm are attempting to do. They want to teach the farmers how to make two blades of grass or two ears of corn or two heads of grain grow where but one grew before; and it seems to me that for the short time they have devoted to this they are succeeding grandly; and now we come here today to dedicate this splendid building that has been erected under their care and their management. This building, the administration building, the building for the offices, is commodious for carrying on and transacting the business of this splendid tract of land, this magnificent farm.

Except for permanent improvements, this station is but little expense to the state. The farm belongs to you, and we here today welcome you to your own. It belongs to the farmers of Ohio. We want them to get all the benefit from it they can; and I am sure that they are getting much benefit from it. The bulletins sent out by the Board of Control from this institution will be of great value to some man carrying on a small farm in the farthest corner of the state. This will be an education for all here to-day, and those of you who have not been here before; I hope you will take time to look over the farm, and to inquire from the members of the Board of Control and the superintendent how these things are managed, and how they will benefit you.

As I stated before, I shall not take up your time with lengthy remarks. The mode of farming has changed so much since I worked upon the farm that I should not be able to tell you anything of interest if I tried, but there are gentlemen here on this platform who expect to tell you something of what they know about farming, and I am going to give them an opportunity. It would not be fair in me to take up your time with a description of the way they used to farm when I was a boy. I worked on a farm until I was fifteen years old, and I know that the boys here of that age will all agree that boys of fifteen years are an important factor on the farm. I said once before, at a gathering somewhat similar to this—at a harvest home picnic—that I left the farm because I thought I could be of more benefit to the farmer in other walks of life. The gentleman who followed said that he left the farm because the farmer wanted him to. (Applause) When the life of the nation was in danger, none turned out

more promptly, more patriotically, than the boys from the farm. They are always ready in every emergency, and in this country we must depend largely upon the farmers for whatever of prosperity we have, and to the farmer boys that are here I want to say, you are engaged in a grand calling in tilling the soil, and for your encouragement let me add—what perhaps you know—that the most famous business men that we have in the country, the great financiers, and many of the leading politicians started on the farm; but I want to say a word about the farmers' wives: "The farmer may work from sun to sun, but women's work is never done." They are not through when the sun goes down, and to them is due all praise; and I want to say to you ladies, that I am delighted to see so many of you here this afternoon, and I thank you for coming here to assist us in the dedication of this building.

Now, I congratulate you that you live in such a commonwealth as you do—in this magnificent commonwealth of Ohio. I have traveled considerably in this state, and I have traveled over other states, and I can say to you that I have never seen a more beautiful or grander landscape than this before us. On the right and on the left, to the south and to the north, no finer landscape have I seen in all my travels. You are to be congratulated, that you live in this splendid county of Wayne, and those of you that live in the other counties, that you are so favorably situated in life. I have met people here from the counties south, north, east and west of you to-day; and as I travel and go west and as I travel and go south, and as I travel and go north and east, I think that the last place I visited is just a little better than the one I visited before. So I thought yesterday, when I visited Stark county, I thought: What more beautiful county than it, what grander place, or more splendid buildings, or more pleasing views to the eye than those that surrounded me there. Well, of course, that was before I had been to Wooster. (Applause) I know that the reason that was so beautiful was because it was right bordering on this county. (Applause). But there is no more beautiful country in the world than this, and, my good friends, there is no better place on earth to live in than this county of Wayne, and the state of Ohio. I will not detain you to tell you of the great soldiers and the great statesmen she has produced and her abundant crops, but, taking it altogether, for people, for soil, for crops, and for climate, too, there is no place on earth that is better than the state of Ohio. (Applause).

Some of us have got up the east slope of life, and have turned and are now going down the west slope, and as we go down let us do the best we can in the days of the years that are left us by our endeavors to make others happy. (Applause). If we do that, of course we shall add to the pleasure of our own living, and when the time shall come when we are to be called away, and our march is ended we shall enter that glorious city not made with hands, where stands the Chief to welcome

us. I thank you my friends, for your kind and courteous attention. It is always a pleasure to me to talk to my fellow-citizens, to tell them of the glories of our country and the greatness of our state, and of the great people who are among her citizens, and it has been a pleasure to meet you here to-day. I will now give way to others, and only add in closing: Good health to one and all, long life to this grand institution, and God speed to the country we all love so well.

THE OHIO AGRICULTURAL EXPERIMENT STATION, ITS HISTORY AND WORK.

ADDRESS BY HON. J. H. BRIGHAM, ASSISTANT SECRETARY OF AGRICULTURE.

Mr. President, Ladies and Gentlemen:

I believe that I can truthfully say that this is one of the proudest moments of my life. I can imagine how a father and mother must feel when they see a puny infant grow into a strong magnificent man, and see him honored by his fellowmen. I feel that way to-day. This institution, the Ohio Agricultural Experiment Station, is very closely related to me. I feel that it is one of my children.

I think my friend, Prof. Lazenby, who is here somewhere to-day, although I don't see him, was, perhaps, the first to suggest this institution. Together we worked upon and framed a bill, and, being a member of the legislature, I introduced it and carried it through as best I could. The politicians of the legislature were a little suspicious of the measure. They did not know what kind of a proposition it was and they looked very suspiciously upon the measure introduced for the establishment of an Agricultural Experiment Station. If I had described to them what we see here today, if I had asked them to enact a law that would give to the people of the state of Ohio such a magnificent institution as you see here, it never would have passed the legislature. I knew that, so we asked but very little—a small appropriation of $3,000 for starting the work. We said: "Make it a non-partisan institution, something that the politicians will let alone so as not to interfere with the efficiency of its work," and sought to have the board of control selected by the agricultural organizations of the state. That was a little too much for the politicians; they could not quite accept that, and I submitted gracefully to an amendment, believing that we could in some other way accomplish the purpose. The measure passed the legislature after some discussion, and when it was enacted into a law, the governor sent for the author of the bill and asked: "Whom will you have to take charge of this institu-

tion?" I said we wanted agriculturists; we wanted practical farmers—men that know and ought to know what will help the farmer; we wanted agricultural organizations represented—the Ohio State Board of Agriculture, the Ohio State Grange, the Ohio State Horticultural Society—the very thing that I had in mind in the first place. He said: "Name your men." I said: "We want a non-partisan body; we want some Republicans and some Democrats on the Board, and, naturally, I thought we would let the Republicans have a majority (laughter.) I selected my friend, Prof. W. I. Chamberlain, secretary of the State Board of Agriculture, as the first member. The second member, Emmet Mix, of Columbus, now dead, one of the grandest men Ohio ever produced, as representing the Ohio State Grange. I named, on the recommendation and suggestion of Mr. Chamberlain, a gentleman from Dayton, Mr. Nicholas Ohmer, to represent the Horticultural Society. We chose him because Mr. Chamberlain vouched for his Democracy in preference to some other prominent men in the Horticultural Society. We were very much surprised at the first meeting of the Board of Control when he announced himself as a Republican of Republicans (laughter.) But we had a grand Board of Control to start the work of this institution, and we selected Prof. Lazenby, the author of the bill, in fact, or the man that helped to prepare and shape it and suggested it, as the director. We employed others, one of whom is here to day, to take charge of the active work of the Experiment Station.

It was a very humble thing then; it was very weak. It was placed under the shadow of the Ohio State University and there the work commenced. We were treated very kindly by the members of the Board of Trustees of the University.

The young man who had the active work to do is on the platform here to-day, a young man from my own county, whom I first knew as a boy, a poor boy living on a little farm down in that county, working very industriously trying to get an education. He took charge of the active work, and for some years he carried all the records of the Ohio Experiment Station in a little canvass bag slung across his shoulder.* Now, that is something of the history of the institution in its youth. *It was weak.* It could not accomplish very much, but it did good work.

This little Station had not been at work very many months before the farmers of the state became interested in its work. They thought they could see in the future that good was to come to the farmers of Ohio from this Experiment Station. I hardly think they expected to see such a magnificent institution as we have around us to-day; none of them dreamed of that then; but they looked for good results. They gave to those engaged therein their encouragement, and the good work went on for several years.

*Prof. Wm. B. Alwood, Vice Director of the Virginia A. & M. College Experiment Station.

A time came when it was thought best to remove the institution from its location at the Ohio State University. There were some very good reasons for this. That farm was within the bounds of a great city. At any time streets might be opened through the farm or sewers laid through it, and the Board of Control, the Directors, the Managers, could not control it absolutely. As ex-President Hayes said: "This land will some time be wanted for the city, and we must keep that in mind." Those greatly interested in the Station, knowing and feeling that this was true, thought it advisable to place this Station where its work would be permanent, where it could not be interfered with in the interests of any city, and, therefore, they secured legislation removing the Station and putting it on ground owned by the State and controlled absolutely for the purpose of agricultural experimentation. We believed that it was a wise move for many reasons, which I shall not to-day take your time to enumerate. Brother Ellis has referred to the steps taken to locate it here. Some people thought a better location might have been found. We were criticised somewhat as a Board, but I think that every one here today, everyone in Ohio familiar with the work that it has done here and that is going on here to-day, will admit the fact that no mistake was made in selecting the location here, in the heart of old Wayne county, one of the best agricultural counties in Ohio (applause.) It is in a good location, a very good location, indeed, as the Governor has told you, and the Governor has told you the truth; whether he told you the whole truth to-day or not I do not know. I believe there is something he would like to have said, but he didn't, and that is he would like to have every good looking man here today—and that includes you all—vote for him next November (laughter). I think he might have said that, but he is too modest.

Now, Ohio people are noted for modesty everywhere. They have been saying down in Washington that the modesty of Ohio passes all belief and understanding (laughter.)

I, like the Governor, have travelled in many states in the Union. I have seen the rugged hills of the East and the West, and the fertile valleys of our country, but I tell you I never expect to see in all the world a grander and more inspiring sight than you can see around you to-day. It is beyond all description.

But the Station was not located here simply because of the beauty of the landscape. It is the business of the institution to help the farmer. He needs help, as we all know, and it is the business of the Experiment Station to help the practical farmer who toils in the fields and in the home on the farm. This work is going grandly on. So far it has been kept entirely free and clear from partisan influence, so far as that influence would be detrimental, and I say you owe your thanks, you, farmers and citizens of the State of Ohio, to the present Governor for selecting a Board without regard to political affiliations and associations. I hope it

will always be thus, that men will be selected for their ability to serve agricultural interests, for their loyalty to this grandest industry of our people.

I am glad that the idea first inspiring those who helped to start and establish this institution has been so faithfully carried out, and I want to serve notice on Brother Boxwell, if he ever gets to be Governor of Ohio, that if he doesn't observe this and keep this institution under the control of practical, sure-enough farmers he will never get a second term (applause and laughter).

Now, then, I know that there is not time to make the speech that I intended to make. There are some other men here—I don't say that they are all eloquent men—but there are some men here who can make good speeches that you want to hear, and I am not going to consume all the time. Some of them are pretty good looking fellows, too;—none quite so tall as I am,—and you want to hear them; but I want to say a word in conclusion about this institution. I believe there is no other agricultural experiment station in all this broad land that has so fair a prospect before it as the Ohio Agricultural Experiment Station. Now, let's keep it in line. You, farmers, can do it. It is your institution. It is here to help you, and in helping you it will help everybody, because we are all dependent upon the farmer. We are not simply working for the farmer but for every one that is interested in agriculture, and all are interested, as you know. Stand by it; watch over it; suggest work that ought to be done to help the farmer; don't be modest about that. The men in charge want your advice; they want your suggestions; they want your help, and you must give it to them. Be true to this institution, as you would be true to yourselves and your families. Study well all the questions that affect the agricultural interests of this great nation, and every interest that is built upon agriculture, which includes them all. Very much depends upon the farmers of our country. Its future is in their hands. They can guide the "old ship of state" into smooth waters. They can bring back prosperity. They can uphold the law. They can put down disorder. They can drive anarchy from our land, and it is their duty as citizens to do this work and do it well. It is your duty to be loyal and faithful citizens, and in your capacity as sovereigns to keep the affairs of state and nation in the hands of rightminded, patriotic men, who believe in the future of the grandest country to be found anywhere in all this world of ours.

In conclusion, I say to my brother farmers: "Stand by this institution; stand by your interests; stand by your homes and your country's flag, and you can leave to your children, perhaps not great wealth, but the grand heritage of freedom, the grandest heritage that can be left to any children anywhere in the world.

I thank you, ladies and gentlemen, for the earnest attention you have given me, and will talk to you no longer.

THE EDUCATIONAL VALUE OF AGRICULTURAL EXPERIMENT.

ADDRESS BY W. I. CHAMBERLAIN, ASSOCIATE EDITOR OHIO FARMER.

My Friends, my Brother Farmers: I want in the few remarks I make to show you how you may help this agricultural experiment station so that it may be a help to you; and unless I can in some sense thus help you to help it, I might better have kept my seat.

What is the object of education? I take it that it is to fit the child, the man, the citizen the better to serve his fellow men, and, therefore, to serve himself and his God. There have been in the past two leading theories of education. The one is that it is a development from within, a drawing forth of what is already implanted in the breast and heart and mind of every child. The word education is, as most of us know, from the Latin word which means to draw forth or to develop. I have some times used the hairspring of a watch to illustrate that theory of education. Have you ever examined the hairspring of your watch? Do you know how much it weighs? It will take 47,680 of them to weigh a pound. A ton of iron ore in the mountain is worth, perhaps, a dollar. A single hairspring adjusted in a watch is worth a dollar and a half, and the crude iron ore brought from the mountain and refined and made into a ton of hairsprings of watches is worth $126.000,000; and that is exactly the development, the education or drawing-out, of what is in that iron ore. Now, can any one say that there is not born in the heart and mind of many a child that which is capable of quite as extended development as this?

The other theory of education comes from the word "instruction," that comes from a Latin word that means to build upon, and the idea of that is that you build upon the mind as a foundation, or that you fill the mind with useful knowledge, as a receptacle or a warehouse is filled with useful merchandise. Now, then, both of these theories contain simply half-truths; and as the upper jaw and the lower jaw together are needed to make the mouth for eating purposes, so these two theories are necessary to a complete idea of education. We must have the addition of useful facts; we must have the development of that which comes from within. The only trouble with those who have held the one theory is they have held it exclusively. The schoolmen in the monasteries of olden times held the theory that you could develop from the mind of man all human knowledge; and so they shut themselves up inside four stone walls, and, in their narrow abode, they evolved a theory of their own, and told us how God ought to have created the world. Modern science comes and does not stay within four stone walls, but goes forth and, looking upon the fields, the parks, the mountains, the quarries, the trees the flowers, the birds, the beasts and fishes—from these it learns how God

did create this world, and follows out this knowledge for our instruction and our benefit, (applause.) I remember that in my early college days we students employed an old English painter and grainer to grain our library shelves to imitate oak. I tell you the oak that he "made" was "fearfully and wonderfully made." I sat and watched him for a long time at his work one day and finally I said: "Mr. Markellie, do you think that really looks like oak, so full of knots and curls?" And I remember just how that old Englishman stood back and cocked his head on one side in a knowing way, and held his graining brush up in his hand as he looked fondly at his handiwork and said: "Well, no, Mr. Chaumberling, that theer don't look like w'at the Lord made the hoak, but that theer looks like w'at the Lord hought to 'ave made the hoak." And so these old monastic schoolmen told, not how the Lord did make this world, but how he ought to have made it. I am glad that modern science tells us the methods which the Almighty actually used in making this world, and shows us how we, by adapting our processes to his methods, may produce marvelous results in agriculture and in all departments of manufacturing. I am glad that I live in these times not in those. Those old schoolmen told of a golden age far past, and seemed to fear that if they lost the learning of the olden times they never could get any more. To-day we go forth into new fields and conquer them, and we are not afraid of losing the learning of the past. Rather we use it and build upon it and thus best preserve it.

Before this agricultural audience you will pardon me if I use an agricultural illustration: You have heard of a cow's, "losing her cud," I suppose. If she "loses the cud," some think she cannot get it again. And so the fear was years ago that if they lost the learning of the past, if they lost that which came from the golden age, they never could get it, any more. What do we do now? We turn the cow out into fresh pas tures to get more grass to make new cuds. We go forth into the field of Nature and study the rocks, the plants and the beasts. As reverently may we now study God's truth written in the rocks as Moses of old studied God's truth written upon the two tables of stone. And it is as truly God's truth today as it was then, and should be as reverently studied.

Now, all this is preliminary. I told you I would try to show you how agricultural experiment may help to educate us. First, then, when you or I experiment and study soils and crops on our own farms, we are developing thought and the power to think. We are having a school for ourselves, and we are developing our minds and making them stronger and better. We, the farmers, are the scholars in this great school of experimentation. Take the main part of the farmers—probably 90 per cent of them and what is their "book education?" It is represented by the little red school house on the hill. We have rather a slow working knowledge of even "the three R's." We lack mental alertness. You will see the average farmer, when he takes his pen to write a letter, cramp

his fingers and chew his tongue in sympathetic motion. Why, he would rather cradle an acre of wheat or mow an acre of grass. It is a laborious process for him—I mean in the neighboring counties! They don't do it thus here, in Wayne county! They are better educated here! (laughter). And when they read the newspaper (in the neighboring counties) you will see them laboriously move their lips and form every syllable as they slowly read. Now what we need (yes, even in Wayne county) is mental alertness. You talk with a commercial traveler. He is as quick as lightning to see a point. Talk with any shrewd business man. Ask him a few questions on this point, or the other, and in lightning time he has made up his mind, and he makes it up right as a rule. I remember a short conversation several years ago with James G. Blaine. I was trying to get a friend appointed to a diplomatic position in Greece. I never in my life saw such an example of mental alertness as Secretary of State James G. Blaine showed while he poured in on me a series of question for ten or fifteen minutes, and went to the bottom of the whole matter and learned exactly why we deemed our friend, President M—, to be especially well fitted for that particular work; and our friend got the appointment the next day. I say I never saw such an example of mental alertness as was exhibited by Mr. Blaine when he saw that I knew the facts and would give them briefly, clearly and honestly.

Now, agricultural experimentation on our own farms is an educational process. It brings us into contact with Nature's materials and forces and requires of us mental alertness. For example, take one single class of experiments that I have this summer on my own farm; experiments on potatoes. There are four different lines of experimentation even there. The field is divided exactly for the purpose. One experiment is on the value of fertilizers, another is on yields of varieties of potatoes, another is on methods of cultivation, the fourth is on the benefits of sub-soiling. Nature will give her answer to *the question that you put;* and if you try to put four questions to her at once, without carefully separating the questions, then she must of necessity mix her answers so that neither you nor any mortal man can understand which answer belongs to each question. You know the story of the boys in Sunday-school, who had each been drilled to give his appropriate answer. The first was to tell who made him, and the second was to tell who was the first murderer and so on. As bad luck would have it, the first boy was gone, and the teacher didn't notice it, and so on exhibition day she began at the head of the class as usual and asked him who was, really, the second boy: "My little boy, who made you?" "Cain," he replied (laughter). The trouble was she put the right question to the wrong boy! Now, take it in our own case as farmers. Nature will never make that mistake. Nature will always answer the question *that we put to her*, and if we put the wrong question we shall get the wrong answer. If we put one question, and if we ask no other mixed with it, we shall get the right answer. I am saying

all this simply to show you how great an educational value experimentation may have for us on our own farms wherever they are.

But there is a far wider field of experimentation than any one of us can manage on his own farm: experiments with 100 plots or 500 plots, all so arranged that there shall be no crossing of questions, so that Nature shall inevitably answer the question that is put to her, and so that the results may be properly interpreted; and that kind of experimentation is splendidly conducted on this great experiment station farm and in these fine buildings, and carried on by men who are fully competent to conduct it.

Next, then, I want to show to you what the experiment stations and the agricultural colleges and the researches of scientific men have done for us along that line of education which I called experiment-instruction. What results have they attained which they can give to us without the vast cost to us of making the same or similar investigation? As I rode along on the railroad today, coming to this place, and noticed the immense sums the railroad company has expended in straightening a few curves, and as I thought what it cost to build that railroad at first—how many years it took to build it, how many months it took to build a single mile, and then remembered that I could pass over that mile now in fifty seconds, then I thought: "This is a fit illustration of the difference between the cost of first finding out or making a thing and the cost of learning or utilizing it after it is found out." I wish I could drive this thought into the heads of my brother-farmers—the difference between the labor and cost of building a railroad through the Hoosac tunnel, for example, and the ease of riding over it at the rate of a mile a minute! That is just the difference between what it has cost to discover and invent and make the things in agriculture that we may use today, and the cost of using them when the knowledge is already given to us. Take this actual illustration: Professor Cook, then of the Michigan Agricultural College, I think, justly has the chief credit not of discovering, perhaps, but of making practical the idea of spraying our fruit trees, vegetables and other things with fungicides and insecticides. "There is millions in it," says the current slang. But there have been and still are millions of good hard dollars in it for the thousands of farmers who take hold of it intelligently and spray their fruit trees or potato patches; and if this and other scientific men had never done anything but invent or introduce and popularize this method for destroying the insects and the scabs and the blights and what not of our fruits and vegetables—if they had done nothing but find out that one thing, it would be worth more to the farmers today than all the agricultural colleges and all the experiment stations have cost them down to this minute of time! Do you believe that? It is true.

Take another single line of experimentation: Many years ago, Boussingault, the French chemist, gave it as his opinion that clover plants in some way have the power of gathering nitrogen, the most expensive

element of plant food, from the atmosphere. He put all the resources of chemistry to the solving of that problem, and failed; and for years the chemists were at work upon that problem, whether the clovers did actually draw nitrogen from the air, and if they did, how they did it, and how we farmers could help them to do it. I remember talking, some fifteen years ago, with Prof. Atwater of Connecticut, in regard to the question. He was then conducting exhaustive chemical and biological experiments to ascertain whether clover actually does attract nitrogen from the atmosphere, and if so, how. Said he: "Mr. Chamberlain, I know that the clover plant under the glass gets more nitrogen than it gets directly from the soil, but how it does so I can not yet find out." And he continued: "We are close upon the heels of a great discovery if we can only make it." It was at last discovered almost simultaneously by Prof. Atwater of our own country and by the German professor, Hellreigel. Now, that one discovery is immensely valuable to us, because we know how the clover plants "trap" the nitrogen from the air, and because we can now help them to do it more freely.

Take another illustration: Bisulphide of carbon. Look at the vast benefits that has conferred in destroying the ants and vermin around our homes, and in destroying the weevil in our grain, and the woodchucks in our clover fields. Any man who will read the reports of our experiment stations to know the power of that over these and similar nuisances, wherever you can get them cornered and choke them to death, will receive great benefit from it.

Take another: The value of commercial fertilizers. There are vast amounts of rotting animal matter in our cities. It brings death if left in the cities. It can bring life and luxuriant growth on many a field. The discovery and utilization of commercial fertilizers have been a vast advantage to the farmers of the country. But I must not enlarge.

This, then, is the educational value of our state experiment stations and agricultural colleges. How shall we benefit ourselves by these things? By visiting the stations, by reading the agricultural papers, by examining closely the bulletins that come from these stations, by studying the tabulated work of the stations themselves, by studying those columns of figures which at first seem so uninteresting to us in their reports, and mastering them. The mental drill that we get from mastering these columns of figures that set forth the results that have been obtained is of great value to us as a mental drill, and the knowlege that we get of the methods by which we may make our agriculture better is also of great financial benefit to us.

I had intended to say a word in regard to what we shall do for the station, in view of these benefits it may confer upon us. We should, in the first place, see that it has every encouragement. Our state cannot afford to be parsimonious towards the interest that is the very basis of most of the wealth of Ohio today. We, as farmers, cannot afford to allow the members of our legislature to be stingy in their appropriations

towards the advancement of genuine scientific knowledge along the lines of agriculture. Then, we cannot afford to neglect the work that we have paid for here, and paid for in our state university and paid for in every laboratory. We cannot afford to neglect those results, but we should study them with the utmost care and apply them in our daily work. Thus may we know and enjoy "the educational value of agricultural experiment."

THE EVOLUTION OF THE EXPERIMENT STATION.

ADDRESS BY DR. E. W. ALLEN, ASSISTANT DIRECTOR OF THE OFFICE OF EXPERIMENT STATIONS, U. S. DEPARTMENT OF AGRICULTURE.

In this century of progress, when the world is overawed by the discoveries of science and the achievements of applied science, we should not fail to realize the progress which has been made in agriculture and in studying the mysterious laws of nature which underlie the most insignificant operations of agricultural practice. No more significant discoveries have been made in any field of science than those in what may be termed agricultural science; and as agriculture is the foundation of all industry, the applications of these discoveries in agricultural science equal in importance to the world those in any other domain.

Modern science reveals the operations of nature. It finds as much that is wonderful in the growth of the blade of grass as in the motions of the planets; as much of inspiration in the process by which a clod of earth gives up its fertility as in the forces that keep the stars in their place in the universe. It is for the acquiring and diffusing of such knowledge, which elevates farming as a profession and shows the farmer's boy that it is a profession in which brains can be used with profit—it is for this as well as for their help to farm practice that agricultural experiment stations have been established and their workers are laboring with so much enthusiasm.

BIRTH OF A SCIENCE OF AGRICULTURE.

The experiment station is essentially a product of the last half of this nineteenth century, and in fact practically all of our present science of agriculture has been worked out within the life-time of the present generation. Previous to this time the practice of agriculture had been based upon traditions and customs which were without scientific foundation or explanation, and although various theories had been propounded and considerable investigation of merit had been carried on there could not be said to be any real science of agriculture. Fertilizers were beginning to be used but there was a lack

of definite knowledge as to what constitutes soil fertility and what materials are necessary for the growth of the plant. The science of animal nutrition was equally vague. Certain constituents, notably nitrogen, were believed essential to the nutrition of animals, but the most prevalent theory as to the value of feeding stuffs was that which compared their effect with that of meadow hay and stated the results in terms of hay value. There was no applied entomology, no agricultural botany, no agricultural chemistry, and the cause of the plant diseases and methods of controlling them were unknown. Science, or what passed for science, had done very little for agriculture.

It was at this juncture that Justus von Liebig, a rising German chemist, turned his attention to the subject of chemistry in its application to agriculture. To Liebig more than to any other man are we indebted for a science of agriculture, and we shall see that this of necessity preceded the establishment of agricultural experiment stations. He reasoned that "a rational system of agriculture can not be founded without the application of scientific principles, for such a system must be based on an exact acquaintance with the means of nutrition of vegetables and with the influence of soils and actions of manure upon them. This knowledge we must seek from chemistry, which teaches the mode of investigating the composition and of studying the character of the different substances from which plants derive their nourishment."

Liebig's first contribution to the subject was a paper entitled "Chemistry in its Applications to Agriculture and Physiology," presented before the British Association in 1840, a masterly production for the times, which aroused a deep interest throughout Europe. He prosecuted his investigations both in the field and the laboratory, taking advantage of the data which had been furnished by the work of Davy, De Saussure, Boussingault and others.

He not only proved the fallacy of the prevailing humus theory, which supposed plants to derive their carbon from the humus of the soil, but as his investigations progressed he clearly established the interdependence of plants and animals, that is, that in breathing man and animals use oxygen and give off carbonic acid gas, which is poisonous to animal life, while plants use this carbonic acid gas in their respiration and give off pure oxygen as a result. The fact that such fundamental principles as these were not understood, perhaps better than any other single fact, gives an idea of the status of knowledge as to plant and animal nutrition at that time.

"The life of plants," said Liebig, "is closely connected with that of animals, in a most simple manner, and for a wise and sublime purpose. The presence of a rich and luxuriant vegetation may be conceived without the concurrence of animal life, but the existence of animals is undoubtedly dependent upon the life and development of plants.

"Plants not only afford the means of nutrition for the growth and continuance of animal organization, but they likewise furnish that which is essential for the support of the important vital process of respiration; for, besides separating all noxious matters from the atmosphere, they afford an inexhaustible supply of pure oxygen, and they thus make up to the air the loss constantly sustained by it. Animals, on the other hand, expire carbonic acid gas, whilst plants inspire it, and thus the composition of the atmosphere, the medium in which both live, is maintained constantly unchanged."

The relation of plants and animals is now so much of a commonplace of science that we fail to realize how recently it has become a part of the general knowledge of mankind, and seldom stop to think by what steps it has been reached or who it was that first traced out the few simple laws which underlie the relations of the two kingdoms of nature and form so fundamental a part of our science of agriculture.

Following his disproval of the humus theory Liebig propounded his celebrated mineral theory of the manuring of plants which, with some modifications, is the foundation of our present knowledge of the use of fertilizers. He conducted experiments on the application of this theory in the practical manuring of field crops. In 1845 he purchased from the town of Giessen about ten acres of barren land on which to conduct his experiments, and this was used for that purpose until 1849; hence it will be seen that to all intents and purposes Liebig conducted an agricultural experiment station with laboratory and experimental fields.

All through the course of his investigations Liebig spent much of his time in testing the application of his theories to practice, and in this his example might well be followed today by many of the European station workers who confine themselves so largely to abstract research.

Had Liebig stood aloof from the testing of his opinions, science and agriculture would alike have been the poorer—science, because this work enabled him to perfect his theories of the action of fertilizers in the soil; agriculture, because in his practical work Liebig gave the agricultural world a splendid example of what experimental agriculture ought to be at a time when such an example was sorely needed.

Liebig expressed on many occasions his desire that farmers should think more for themselves. In the preface to his "Natural Laws of Husbandry," published in 1863, he called attention to the fact that no progress could be made so long as agriculturists continued to allow themselves to be guided merely by the facts observed in their neighborhood or at most by the system of some recognized authority. "If farmers would only make up their minds, he said, to acquire by experiments on a small scale an accurate knowledge of the productive power of their land for certain kinds or classes of plants, a few more experiments would readily enable them to discover what nutritive substances the land contains in minimum proportion and what manuring agents ought to be applied to insure the production of a maximum crop."

The work of Liebig and his writings made a deep impression in agricultural circles throughout Europe, and although farmers and agriculturists were slow to accept his theories and were inclined at first to regard them merely as new-angled notions, his work gradually aroused wide-spread interest in agricultural experimentation and in the relations of science to agriculture.

THE ESTABLISHMENT OF EXPERIMENT STATIONS.

This soon led to agitation in Germany for the appointment of chemists who should devote their services to the interests of agriculture, and in 1851 this resulted in the establishment of an agricultural experiment station at Mœckern near Leipsic. It is worthy of note that this first station was established by a farmers' club, who furnished the equipment and means for carrying on its work until government aid could be secured. The Mœckern Station is generally conceded to be the first experiment station, organized and established as such, with state aid, for the promotion of agriculture. Boussingault had for sometime carried on experiments in agriculture at Bechelbronn in Alsace; Liebig had, as we have seen, conducted a laboratory and experimental fields at Giessen; John B. Lawes, at Rothamsted, England, had made experiments, beginning with 1837, on the use of phosphates treated with sulphuric acid, which led in 1842 to his taking out a patent for treating mineral phosphates with sulphuric acid; and in 1843 Dr. J. H. Gilbert, a pupil of Liebig, became associated with Mr. Lawes in his work, and the more systematic experiments at Rothamsted were commenced. But the action of the Saxon agriculturists in the middle of the century marks the beginning of the Experiment Station proper—the organization of scientific research with the aid of the government "as a necessary and permanent branch of agriculture."

The first director of the Mœckern Station was Dr. Emil Wolff, and upon him devolved the duty of organizing and planning its work. About this time extensive experimental work was inaugurated by Prof. Georges Ville in France. Ville was an enthusiastic advocate of the use of artificial fertilizers, and next to Liebig he perhaps contributed more than any other man to the extension and systematizing of the use of commercial fertilizers. He early outlined and advocated a system of plat experiments for the purpose of studying the fertilizer requirements of soils, which is substantially the same as that followed in such work today, and which this Station has carried out on such a magnificient scale. Wolff, on the other hand, systematized the science of feeding animals, gave us feeding standards, and methods of compounding rations, and made rational feeding practicable. It may be noted in passing that these two men, Wolff and Ville, who took so prominent a part in agricultural investigation from the very start and who did so much to bring about the application of the teachings of such work in practice, have both died within the past

six months. They had seen the experiment station enterprise grow from its very inception until it spread to nearly every country of the civilized world; and during their active lives they had followed the development of agricultural science from a mere beginning, consisting of fragmentary investigations and a few hypothetical theories, into a well-rounded, comprehensive science.

The movement begun in Saxony spread quite rapidly. In 1856 there were five stations; in 1861, 15; in 1866, 30; and to-day these institutions are numbered by hundreds. Germany alone has sixty-six stations, and they have spread to Austria-Hungary, Belgium, Holland, Scotland, Ireland, Spain, Portugal, Italy, Norway, Denmark, Sweden, Switzerland, Russia, Roumania, Bulgaria, Brazil, Java, Japan, South Africa, Canada, and to every state and territory of our own broad land.

AMERICAN EXPERIMENT STATIONS.

The first Agricultural Experiment Station in America was established in Connecticut in 1875. The example was speedily followed elsewhere. In 1880 four stations were in operation, and in 1887 there were some seventeen of these institutions in fourteen states. In that year Congress made the enterprise national by an act known as the Hatch Act, appropriating $15,000 per annum, for the maintenance of an Agricultural Experiment Station, to each of the states and territories having agricultural colleges or agricultural departments of colleges. To-day Agricultural Experiment Stations are in operation under this act of Congress in all the states and territories. Alaska is the only section of the United States which is without an Experiment Station, and during the present summer that country will be explored with reference to its agricultural possibilities and the feasibility of undertaking experiment station work there.

Excluding the branch stations established in several states, the total number of stations in the United States is fifty-four. Of these fifty-two receive the appropriation provided by the Hatch Act. The total income of these station during 1896 was $1,133,791, of which $720,000 was received from the National Government, and the remaining $413,791 derived from State Governments, fees for analyses, sales of products, and miscellaneous sources. The stations employ 546 persons in the work of administration and investigation, and including the boards of control the total number of persons intimately associated with experiment station work in this country is over one thousand. During 1896 our stations published 45 annual reports and 323 bulletins which were sent to mailing lists aggregating about half a million names.

In many respects the American stations are very different from those first established in Germany and which are in operation in Europe to-day. They are more practical in their workings, and keep in closer touch with the farmers in whose interest they are working. The Euro-

pean stations publish the results of their work in scientific journals and in agricultural papers, but they have no regular system of bulletins and reports and it is exceedingly difficult to follow their work on that account. The generous plan of diffusing information followed by the American stations is without a parallel. Through regular bulletins, newspaper bulletins, annual reports, correspondence and lectures at farmers' institutes and other meetings, the results of the work at our stations are spread broadcast, and are brought within the reach of every farmer of the country. Every intelligent farmer may obtain and make use of the stations' results, and under the liberal policy pursued by the stations the responsibility for his failure to avail himself of their teachings must rest with the farmer.

The Experiment Station System of the United States is the admiration of other countries. This is evidenced by the expressions and the writings of the many Europeans who have visited this country in the past few years and made a tour of our stations. The act under which the stations each received $15,000 annually for the Federal Government makes the appropriation a part of the appropriation for the United States Department of Agriculture, and provides for certain supervision of the work and expenditures by the department and for co-operation between the department and the stations. This gives an organization which strengthens the whole movement, and materially increases in the usefulness of the stations. The Office of Experiment Stations, which is the link between the Secretary of Agriculture and the stations, represents the interests of the stations, assists them in many ways, compiles the results of their work in technical and popular form, and thus helps to diffuse the teachings of the different stations throughout the country. In 1893 it issued a Handbook of Experiment Station Work, which was a popular review of the work of the stations from their establishment to that time, and comprised over 400 closely printed pages. As the results of the stations' work were presented in a very condensed form, this will give some idea of their extent nearly four years ago.

One very disturbing influence in the case of a considerable number of stations has been the element of politics, resulting in changes in the boards of control and of the directors and staff of the stations. The element of permanency is one of the first requisites of good station work. Results of permanent value can not be obtained in one or two years, but frequently several years of work along a definite line are neeessary for the accomplishment of results which will be of the highest value. To make frequent changes in the staff is to interpose a most serious obstacle to the usefulness of a station. Another factor which has retarded the development of the stations in a number of states and has proved detrimental to their best interest has been the division of the Hatch fund and maintenance of a number of substations. The fallacy of this policy has been abundantly demonstrated. Only superficial work of local application can be carried

on under such an arrangement, and results of equal value could usually be obtained by co-operation with leading farmers in different parts of the state.

The State of Ohio is to be heartily congratulated that it has kept its station free from such influences as these, and has allowed it to pursue a permanent policy of management.

Mention was made above of the fact that last year the stations derived over $400,000 from other sources than the Federal Government. The liberality of the states in supplementing the Hatch fund has increased as the usefulness of the stations has been more and more appreciated. Such aid is very necessary, as the Hatch fund is limited and its uses restricted to investigation. The liberality of the state in providing this magnificient building, dedicated to agricultual science, is worthy the highest commendation, and will do much to help along the cause in other states. It is but another testimonial to the esteem in which the Experiment Station is held in the hearts of the farmers of the state—a reward well earned.

THE NATIONAL DEPARTMENT OF AGRICULTURE.

Recently one of our station directors has been selected to preside over the National Department of Agriculture at Washington. This was a most fitting recognition of the position which the experiment stations occupy in the minds of the people as the leaders in agricultural thought and the representatives of the best interests of agriculture. For Secretary Wilson this was a promotion from a State experiment station to a National experiment station, surpassing in its scope and its facilities any other experiment station in the whole world. The United States Department of Agriculture is unique. In many respects it may be regarded as the highest type of an experiment station. Charged with certain executive functions, by far the larger part of its resources and efforts are devoted to the promotion of agricultural science and the diffusion of information among the farmers of the country. This Department was established as a section of the Patent Office by an appropriation for the collection of agricultural statistics in 1839. It became a separate department in 1862, and was raised to the dignity of an executive office in 1889. It now represents nearly every phase of agricultural interest. It includes a Weather Bureau, charged with the forecasting of the weather and the issue of storm and other weather signals for the benefit of agriculture, commerce, and navigation, and for studying the various relations of meteorology and agriculture; a Bureau of Animal Industry, charged with the inspection of meats for interstate and export trade, with the control and eradication of contagious diseases, and the investigation of the diseases, parasites, etc., of domestic animals; a division for the collection of agricultural statistics; an Office of Experiment Stations, which represents the Department in its relations with the experiment stations in all the states and territories, and which compiles and reports upon

the work and expenditures of the stations; divisions of Chemistry-Entomology, Biological Survey, Forestry, Botany, Vegetable Physiology and Pathology, Agrostology, Pomology, and Agricultural Soils, each devoted to special lines of agricultural investigation; Offices of Fiber Investigations and of Road Inquiry; and a Division of Publications.

Of the 2,019 persons employed in the Department of Agriculture, 993 are engaged chiefly upon scientific and technical work; and of the $3,202,902 appropriated by Congress for the next fiscal year, approximately $1,170,000 is for use directly in conducting scientific investigations in agriculture. To this amount may be added $85,000 available for printing and binding the miscellaneous publications of the Department, and about $300,000 for printing the half million copies of the Yearbook of the Department. Last year the Department published 376 separate technical and popular bulletins and reports, comprising over 10,000 pages, and aggregating over six and one-half million copies. Adding to the amount used for conducting investigations at the Department, the $720,000 appropriated for the agricultural experiment stations in the several states and territories gives the munificient sum of $1,890,000 appropriated by the Federal Government for the promotion of agriculture by means of investigation and experimentation during the year 1897–'98, an amount which far exceeds that appropriated by any other government in the world for this purpose.

But the question may reasonably be asked, what have we to show for this enormous expenditure of money?

WAYS IN WHICH THE STATIONS HELP THE FARMER.

The service which the stations have rendered in promoting the education of our farmers is incalculable.

Even if the station bulletins recorded only facts well known to scientists and advanced agriculturists, the influence of such a far-reaching system of popular education in agriculture must be very great. So vast a scheme of university extension has never been undertaken in any other line.

The stations have also taught the farmer how to help himself. In a number of lines their work has shown that to be thoroughly successful the farmer must himself be an experimenter. This has been notably brought out by the experiments in the use of fertilizers. Hundreds of farmers have already made experiments in co-operation with the stations, and have thus learned something about proper methods of experimenting, and have given their neighbors valuable lessons on the way to apply the experience gained by scientific investigators to the peculiar conditions of individual farms.

But the stations have also found out many things which are new, and have performed services of great economic value.

In the study of soils and fertilizers; in the tests of new varieties of cereals, forage plants, vegetables and fruits; in researches on the compo-

sition and digestibility of feeding stuffs; in feeding experiments, especially with pigs and dairy cattle; in investigations in dairying, especially regarding means for testing milk and the methods of cheese making; in observations on plant diseases and injurious insects, and in experiments on the repression of these foes of the farmer, many useful results have been reached which have already found extensive application in farm practice.

In general it may be said that the stations are in better condition than ever before to do efficient service for the improvement of our agriculture. Experience has shown the need and value of experimental inquiries in the lines pursued by the stations, and the economic results have been sufficient to justify the continuance and development of these institutions under such conditions as will enable them to do their most useful work.

On all sides we hear of increased demands from the farmers for the information which the stations have to give. Station officers are constantly being urged and tempted to interrupt the search after new truth in order that they may set forth more clearly and systematically in the language of the people the results of previous investigations in the realm of agricultural research in this country and abroad. That the benefits of station work are realized by increasing numbers of our farmers is well shown in the general disposition of the states and local communities to supplement the funds given by the National Government. Wherever stations are doing thorough work there is a rising tide of popular support of their enterprises, and we may confidently expect a still greater development of this movement in the future.

PERMANENCY OF THE STATIONS.

The experiment stations have become permanent, indispensable State institutions. The name itself evidences this permanency. They are no longer "experimental" stations but stations for experimentation.

The future of the stations grows more promising year by year, and as progress is made new fields for activity present themselves to view, and the practical usefulness of their work becomes more indisputable.

The enduring character of this building, which we are gathered here to dedicate to the uses of agricultural experimentation, itself bespeaks the permanency with which the Experiment Station is established in the State of Ohio. It is no temporary institution to accomplish its purpose in a few months or years, but it is a permanent endowment to the science and practice of agriculture, a lasting home for agricultural investigation. Born of a need felt by the farmer for assistance in coping with the elements, the experiment station has made a steady, healthy growth until at present it has reached a point where it is indispensable to the farmers and horticulturists, and has won a place in their confidence and their hearts which will cause them to lean more and more heavily upon it as years go by, and to guard its interests as their own.

THE STATE AND THE EXPERIMENT STATION.

OPENING REMARKS BY TOASTMASTER A. D. METZ, ESQ., AT THE BANQUET.

Ladies and Gentlemen: We hope that you will turn this way and give attention to the speakers of the evening. I wish to say, ladies and gentlemen, in advance, that so far as I am concerned I shall be exceedingly brief, as some of our distinguished guests, who will address you upon this occasion, will soon have to take the train for home.

The first toast upon the program is "The Station and the State," The greatest country upon the face of the earth is the United States of America. The greatest and most brilliant office and position in the world is the office of the President of the United States, now occupied and filled by our distinguished fellow citizen, William McKinley (applause). The next greatest thing upon the face of the earth is the State of Ohio (applause.) And the proudest place occupied by mortal man, next to that of President of the United States, is the position and office of Governor of the great State of Ohio. We have tonight, my fellow citizens, a distinguished visitor who is, like William McKinley, from the State of Ohio, and who occupies that proud and distinguished position—Governor of the State of Ohio (applause.)

I do not remember, ladies and gentlemen, in the history of good old Wooster and Wayne county, that we have ever been honored with the presence of a Governor of Ohio at a social banquet, and I know that you are all tonight filled with great expectations, not only to hear our distinguished guest, the leading citizen of this great commonwealth, but other distinguished guests who are present with us tonight.

I have the great honor, then, tonight, ladies and gentlemen of Wooster and Wayne county, of introducing this leading citizen, and I only want to say to the honorable gentleman that Wayne county not only boasts of an agricultural experiment station, but we boast of a great seat of learning, and above all, we do boast that we have the most intelligent citizens of any county in the great state of Ohio. I want to say to the gentleman in advance that that is our position as one of the counties of this great commonwealth, and we are proud of it tonight.

I now have the pleasure to present to you, my fellow citizens, this distinguished citizen of our commonwealth, and I now present to you that splendid type of manhood—Governor Bushnell.

RESPONSE BY GOVERNOR BUSHNELL TO TOAST.

Mr. Toastmaster, Ladies and Gentlemen: I want first to thank the toastmaster for his very gracious and complimentary introduction. There is nothing that I know of that is so effective in removing any embarrassments a speaker may have on first facing his audience as a

graceful introduction and a cordial greeting. Mr. Toastmaster, I feel that I have been most fortunate in both these respects to-night.

The duty assigned me, that of responding to the sentiment of "The Station and the State," is a very pleasant one; but, if the toastmaster will permit me, I will reverse the sentiment, and respond to "The State and the Station."

When that colony from Massachusetts and Connecticut landed at the mouth of the Muskingum, they resolved they would form a state, and it should have for its chief objects, morality, religion and education. These pioneers came into this north-west territory, not fugitives from justice fleeing from their native states, but they came as intelligent and educated men—friends of Washington. Some of them had been intimate with him. He said of this colony, and of this territory that they were going into—to establish homes—that no people ever started out under more favorable auspices for the founding of a colony than those who emigrated from Massachusetts and Connecticut to the North-West Territory in January, 1788. He said further that if he had been a younger man he would have felt very much like going out and joining them and settling in this state, or in this, then, territory. If he had carried out his inclination we should have had from Ohio the first President of the United States as well as the last President of the United States (applause). Now, these brave colonists came out here and they carved out of this North-West Territory the State of Ohio, the first of the states formed from that territory, setting up, as I have said, for its chief object, morality religion and education. That was 109 years ago, and how they carried out their resolve and their children have carried it out, we well know.

Ohio certainly does as much for the education of her youth as any state in the Union. Statistics show, if I am not mistaken, that Ohio collects more money and spends more for public schools than any state in the Union. And, carrying out this resolve of these colonists before Ohio was a state, they established a university at Athens, following, soon after, it became a state, with another University at Oxford; and we can now point with pride to the great educational institutions of our state. We have, besides the common school system, great universities and seminaries, where the young may get an education at small expense. Ohio has devoted much time, attention and interest to the education of the youth of the state. President Garfield said he never passed a ragged boy upon the street without thinking he might owe him a salute, for he didn't know what possibilities were buttoned up under that ragged coat. We love the boys, whether they are high or low, rich or poor. Men are only boys grown up, and any state or country that takes care of and educates its youth, will be a prosperous state and a prosperous country. That has been the aim, and that is why we can point to the great men, the great generals, and the great statesmen of Ohio. It is because this state has devoted time and money and effort and care to the education of its youth.

Speaking of the public school system of our state, I must say a word in special praise of the schools of Cincinnati, for it was there that I attended school until I was nearly 15 years of age, and after that, unfortunately for me, I had no time to attend a college or university, for I was obliged to make my own way in the world after that.

In Cincinnati they have 75 splendid school buildings that are built and maintained by the people of that city, 960 teachers, and 44,700 children attend these schools. That is only one example; there are similar cities and schools throughout the state, and we thank God that there is not one school building in any city or village or hamlet that has not the stars and stripes floating over it (applause).

Now, Ohio having done so much in the way of universities and schools and seminaries for the education of its youth, her next duty is to educate those who are older, and this she does by the establishment of an Agricultural Experiment Station, to aid and educate the farmers, and what class of people are more entitled to aid and to education and to assistance, than the farmers of our state? And Ohio comes forward and says: Now, having provided for the education of the youth, we will look after the advancement and the education of our agriculturists. I am very proud that it has been my privilege to lend some little aid, and certainly this institution has always had a good word from me whenever I have been able to speak for it, and I have always taken a great interest in its success. An honest confession is good for the soul, and I will confess that if I could have prevented it, you would not have had the Station here. Clark county is my home, as you know, and we wanted the Agricultural Experiment Station there, and we offered over $75,000.00 to get it, but, President Ellis has said, that was all proper and liberal on our part, but we hadn't the farm to offer such as you had here in Wayne county. He no doubt thought so, but we did not; however, you are to be congratulated that you had this fine farm to offer to the State for this purpose, and it accepted it. It was not that we wanted to deprive you of good, but we thought if we could have it established down there it would be a good thing for us. I certainly am very proud of it, and I congratulate the citizens here in Wooster and in this county of Wayne that you secured the farm here, on which to make experiments for the benefit of the farmer. I do not look upon it now as an experiment. It is a splendid success. True the director and the professors have used it somewhat for making experiments, but the farm itself and its location are no experiment, but a magnificent success, and I congratulate you, Mr. President and Members of the Board of Control, that we have so grand an institution.

Now, I have said a few words for the State and a few words for the Station. I am proud of them both. What grander state in the Union than Ohio? There are other great states, and we are happy and proud that ours is one of the 45 of the Union. But I don't know—and I want to be fair to the people of the other states—I don't know honestly now

of any part of this great domain of ours that is quite so good, and, I will say, quite so beautiful in every respect; that has quite so good people, or quite so pure a climate, as the state of Ohio (applause).

Now, I have spoken of all these things, and it is proper for me to tell you that we were out to a banquet last night until about one o'clock, and I promised my wife that I would be home at ten to-night, and I don't think it would be fair to myself or to the better three-fourths of my family that I should proceed further, and I know you are ready to excuse me. But I cannot close without expressing the pleasure I have had with you to-day. It has been one continual round of pleasure as we have gone from one thing and one place to another; and I am indebted to you greatly, my fellow-citizens of Wooster and of Wayne county, for the enjoyment you have given me. I shall always remember my visit here. The kind way in which you have treated me will ever be a pleasant recollection, and I shall always feel your debtor; and if there is anything that I can do for you in any way, all that you have to do is to call upon me.

I see by the sentiment to my toast that God Almighty has planted a garden. It seems to me in the planting of that garden one of the choicest spots in it must have been Wayne county; and in creating the people for that garden of Wayne, He placed in it a little the best people that He had made. I thank you very kindly for all the courtesies you have extended me, but I don't want to forget to say that I was very much pleased to see here two battalions of the National Guard, the citizen soldiers of Ohio, splendid young men who are ready for any emergency. God grant that they may not be called out for service; but if they should be, they would form a nucleus for the best army that ever marched to the field; and I was very proud, a few days ago in that magnificent parade in the city of New York, that we could have there about eleven hundred of the Ohio National Guard; and while they were not so handsomely uniformed as some, yet their soldierly bearing attracted attention, especially of the officers of the regular army who were there and saw them. They said: There are men that are ready for the field to-day if they are needed. It is, as I said, the nucleus of a great army. We have in the state of Ohio 650,000 men capable of bearing arms if they should be needed. But we do not want war. We have had war enough; but I know the sympathies of our people—fair-minded, liberty-loving people—must go out to the patriots in Cuba who are fighting to escape from the tyranny of Spain. We don't want war with anybody, and we need not have any. We need not be afraid, however, of any one or all of the foreign countries with their 11,000,000 of soldiers, we have 10,000,000 that will make soldiers in this country. So we need not be afraid, and while we do not want war, is it not time now for the United States to say to Spain: This butchery must cease! That's all, I believe, it would be necessary to say. I see that some steps have been taken, and I hope it will not be long until the good offices of this country will be used in behalf of relief of the Cubans.

Excuse me, my friends, I did not intend to branch off on this subject. I wanted to refer to our National Guard. They give their time to the service of the State, and the State should treat them liberally and encourage them in their work. I most heartily commend them for their good service.

Again, my friends, I thank you, for your many courtesies, and wish you all prosperity.

THE EXPERIMENT STATION AND THE NATIONAL DEPARTMENT OF AGRICULTURE.

Remarks by Toastmaster.

Ladies and Gentlemen: The distinguished gentleman, whom I have the pleasure to introduce to you next, is from Washington, but I want to say to you that he is an Ohio man; and Maj. McKinley in selecting his cabinet and assistant cabinet officers had to again come to Ohio to get a gentleman to fill this great office; a gentleman who is not only large in stature, but, we all know, is great in intellect, great in heart, and great in the affections of his fellow-countrymen.

I have the pleasure to introduce to you Col. J. H. Brigham, Assistant Secretary of Agriculture, whose topic will be the relation of the Station to the National Department of Agriculture.

Response by Hon. J. H. Brigham.

Mr. Toastmaster, Ladies and Gentlemen: Before responding to the toast, I desire to congratulate the citizens of Wooster and Wayne counties on the success that you have achieved here to-day. You have with you your most distinguished fellow-citizen, the Governor of the State. But you have more than that, and better than that: You have the governor of the Governor in the person of his good and estimable wife. It adds very much to the pleasure of the occasion and the success of it.

I notice that I am to respond to the "The Station and the United States Department of Agriculture." I do not wish to make the same speech that I made to-day, and I will try to keep as far away from it as possible.

I am sure that in these latter days we appreciate the fact that the farmer is doing a great deal of good in the country; that he is a very important personage. We could dispense with some of the professional gentlemen and those engaged in other branches of business and still survive the loss. We don't wish to do this, however, and I want that understood; but we could not dispense with the farmer.

He feeds us all, he clothes us all; and without his earnest effort, his skill and care and patriotism, the United States of America, which we have heard lauded, and not too highly, and the state of Ohio, of which we have heard good things, but not anything that is too good, would not amount to much. We are all dependent upon him. The farmers are usually considered a modest class of people, and I don't think there are any exceptions that I know of. My friend Dr. Chamberlain even, is a modest man, although a farmer; but the people begin to appreciate, as never before, the importance of this great industry and of this great class of our citizens. They see the necessity of giving them every opportunity to become masters of their profession, to learn how to till the soil and garner the harvest.

They have planted here in your midst an agricultural experiment station for the purpose of teaching the farmers new and better ways of tilling the soil and how to preserve its fertility and I want to say that this section, this town and county, I consider one of the favored spots, because that is true. You will live to see, or your children will live to see, that institution on the hill one of the first in the state, I believe, because of the good work it will do for agriculture. I am proud to have been connected with the establishment and work of the station. I notice to-day that your Board of Control, without consulting me in the matter, have inscribed my name, with others, in marble, and I am proud of it. I would rather have that pointed to in future years as a work with which I had something to do; as an institution that I helped to plant, than to have the fame of an Alexander, or to have the distinction won by other great soldiers who left wrecked homes and widowed wives and orphaned children in their track. I am proud that I can have it said to my children and my children's children, that their father or their ancestor had something to do with establishing this grand Station and starting it out on its grand work.

Now, my fellow-citizens of Wayne county, the state of Ohio has contributed, and the United States has contributed, to the success of this institution. We are all interested in it. It is established here in your midst; it belongs to you. Watch and guard it well! See that nothing that the Station needs to make its work a grand success is lacking! Give it your sympathy! Give it your encouragement! Watch and guard it well! You will do it.

I have the honor and the pleasure, in a modest way, to represent the Department of Agriculture of the United States. Its work is somewhat different from that of the Agricultural Experiment Station. It is not to enter into the details along certain lines that the Station does, but it is to do a grand work for American agriculture, I believe; not only for agriculture, but for our entire country. It has been my boast and pride always that in working for agriculture and the farmer I was working for every other class, for every other man, for every other interest that

depends upon agriculture. I take no narrow view of the work that is being done for agriculture. We are all dependent upon it. The Department of Agriculture should encourage these Stations. It should watch legislation at the fountainhead of law-making in the United States. It should see that nothing is placed upon the statute books of the Nation that will in any way interfere with the success of these institutions. It should search the world over to find good markets for the surplus of American products. It should keep the farmers of the United States thoroughly informed as to the condition of crops in the United States and of the world with which we come into competition. Along these lines the Department of Agriculture can do work that will help the farmer; and I will say to you, as one of its representatives, that we are trying to do that to the very best of our ability. We want your help and support and sympathy. We want your counsel and advice; and I believe that those connected with that department, with your assistance, with your co-operation, will do for agriculture what never has been done before in this country. These two institutions should work together hand in hand. There is no reason why they should not; and, so far as I am concerned, having been connected with this institution in Ohio, and being now connected with the Department of Agriculture, whatever I can do in any capacity to continue the harmonious relations that now exist, I shall gladly do.

Now, I thank you, ladies and gentlemen, for the pleasure I have enjoyed. It has been a grand day for me. I thank you for every courtesy extended, and I hope that if I come again to your town and visit your Station, that I may see as great progress as I have noticed on this visit since the time I visited it a very few years ago.

I thank you.

BONDS AND BANKS.

Remarks by Toastmaster.

Ladies and Gentlemen: "Bonds and Banks,"—I know you are all exceedingly interested in this next toast, as this will be responded to by our fellow-citizen, a well known and highly esteemed fellow-townsman. Some one has beautifully said: "The wealth of a community lies in the integrity of its citizens," and this arises not from the possession of great riches, but in the possession of true men. This community possesses in Col. Hard a true man. It gives me great pleasure to-night to present my personal friend and your enterprising, able and gentlemanly fellow-citizen, Col. C. V. Hard, who will respond to this toast this evening.

Response by Col. C. V. Hard.

Mr. Toastmaster, Ladies and Gentlemen: An old man by the name of Polonius once said to his son, Laertes, who was about leaving home to carve out for himself a career in the great world: "Neither a borrower nor a lender be, for loan oft loses both itself and friend, and borrowing dulls the edge of husbandry." In the sense in which Mr. Polonius meant this, it is most excellent counsel, and worthy of all acceptation. And yet, if all mankind were to interpret this advice and observe it literally, there would be neither use nor excuse for such a commodity as bonds; and the business of banks, like Othello's occupation, would be gone. The philosophy which we read between the lines of Polonius' advice prevailed for a long period of time. Away back before the Christian Era, Aristotle promulgated the economic doctrine that money is a barren thing, and is not intended by the laws of nature, and ought not to be permitted by the laws of mankind to beget increase or progeny. This doctrine prevailed for many centuries; and along in the middle ages the taking of interest for the use of money or capital was condemned by moralists and denounced by the church, so that he who engaged in it bore the stamp of infamy and encountered the anathemas of religion. But as civilization advanced and intelligence spread this false economic doctrine was dissipated, until in our day and generation it has come to be regarded as quite as legitimate to accept compensation for the use of money as for the use of capital in any other form.

The borrowing of money presupposes the existence of a lender somewhere; and if it is legitimate for one who has not enough capital for his own use to borrow from another who has more than he needs for his own use, and pay for the same, it follows, as a matter of course, that it is in accordance with good morals and public policy to accept compensation for such use.

This is what is called the borrowing and lending of money. The instrument or contract which passes between the parties in a transaction of this kind in the case of individuals is called a note; in that of municipalities or corporations it is denominated a bond; and this is the instrument by which capital or credit is transferred from one to another. Did you ever stop to think for a moment of the significance of that little abstract thing which we denominate credit—what it is and what it has done? It is one of the most potent instrumentalities ever employed by man for the improvement of his race. It reaches its highest development where civilization and intelligence have attained their greatest growth. It gathers up capital which would otherwise lie dormant and useless and converts it into a mighty engine of industry and progress. It sets in motion the wheels of manufactures, and carries the usufruct of industry into millions of homes. It levels our forests and converts them into homes for the people, or transforms them into peaceful navies, which traverse our rivers and inland seas, or plough the great ocean, carrying the

products of our soil into every portion of the known world. No obstructions of nature can withstand the skill of the engineer when supplemented by its magic power. It bridges the mightiest rivers, and tunnels great mountains. It covers the land with roads of iron and steam, bringing the most distant points into close juxtaposition with each other. Without it the Suez Canal, which connects the great oceans, never could have been built. Without it scarcely one of the 200,000 miles of railway, which cover our own land like a network, could ever have been constructed, and certainly without it our own government never could have commanded the $4,000,000,000 required to preserve itself when its existence was assailed a little more than a generation ago. Its uses seem almost illimitable and its power magical. A study of the uses to which credit has been put in developing mankind discloses some interesting facts. Let me from memory recite a few figures: The Republic of Mexico, lying south of us, with a population of 10,000,000 of people, has a public debt of about $175,000,000; the Dominion of Canada, on our north, with about 5,000,000 of people, has a public debt of about $225,000,000; and the United States, with a population of 70,000,000, has an interest bearing debt of about $900,000,000. There is a single great railroad corporation in the United States whose bonded indebtedness exceeds the public debt of the Republic of Mexico, and nearly equals that of the Dominion of Canada, There are, at least, five great railroad corporations in the United States whose bonded indebtedness equals or exceeds that of the Republic of Mexico and whose combined indebtedness exceeds the bonded indebtedness of the United States of America. The great bulk of municipal indebtedness represented by what are called municipal bonds is incurred for the purpose of building waterworks, sewage systems, park systems, paving streets and other kindred public improvements, including a considerable sum applied to the construction of railroads. It is a curious fact that, although the constitution of the State of Ohio has been interpreted to prohibit the use of municipal credit in the construction of or aiding in the construction of railroads, more than one-third of the municipal indebtedness of the State of Ohio is incurred for that purpose to-day.

But it is not money or bonds or per cent. that has brought the people of Wayne county and Wooster and the State of Ohio together to-day and this evening. The thing that lies nearest our hearts is the fact that the state of Ohio is the owner of an estate of nearly 500 acres lying at the top of Madison Hill, which is set apart to agricultural uses. Those of us who have spent our lives in this immediate vicinity do not hesitate to say that a fitter spot for this Station could not have been found anywhere on this green globe of ours. In the first place, it is in the United States of America, the grandest example of the people governing themselves known to history. In the second place, it is in the State of Ohio, the home of statesmen and soldiers and scholars, and now disputing with Virginia the title of "Mother of Presidents." In the third place, it is in

Wayne county, the county that produces more wheat than any other in the State of Ohio; that surpasses all others in its production of oats, and that is the home of an intelligent, enterprising and patriotic community of farmers. And last, it is situated on the top of a hill where "every prospect pleases," and from which it looks down upon the most beautiful little city that one can find in many days' travel.

It is an institution established by the commonwealth in behalf of an interest which has never hitherto received from the government the encouragement which its importance merits. It is founded, as is set forth in the law under which it was organized, for the purpose of developing the vast agricultural interests of our state. Every other great interest has been encouraged and fostered by departments or bureaus of the Government and by professorships or technical schools endowed and supported for the purpose of spreading knowledge, each on its particular subject; but the opinion seems to have prevailed widely until within recent years, as Horace Greeley once put it, "that anybody who had sense enough to go in out of the rain could make a good farmer." It is true that almost anybody can farm. It is also true that almost anybody can preach, or practice law, or pursue any of the other professions, but it requires skill and special training to succeed in agricultural pursuits as much as in any of the other professions in which men engage. Agriculture is the oldest, the most important and the most universal of all the arts. Away back in time where history is lost in the mists of tradition the greatest, as well as the meanest, of mankind were husbandmen. According to the Scriptural chronology the first man born of woman became a tiller of the soil, and his brother was a keeper of sheep, whose flocks and herds grazed and fattened on a thousand hills. Isaac, the son of Abraham, who was the founder of a race, was a tiller of the soil; for we read that he went down into the Valley of Gerar, where he sowed in the land and the same year received a hundred fold. Job kept 500 yoke of oxen, with which he ploughed and cultivated his fields. Noah, when he came forth from the ark, at once assumed the vocation of a husbandman, and Babylon and Ninevah and Memphis, cities of the Nile, the Tigris and the Euphrates, centers of civilization and art and religion, adorned with splendid palaces for the living and magnificent tombs for the dead, with stately temples dedicated to the worship of the thousand gods of mythology, and colossal obelisks erected to the memory of dead kings and warriors, sat in the midst of fertile plains, whose generous soil yielded in profusion her richest gifts when beguiled by the blandishments of the husbandman.

An agricultural community is not often the seat of great individual fortunes, because nature distributes her gifts with a more even hand, but it is, above all others, the center of contentment and happiness and patriotism. As long as men have homes to defend and families to protect, that public spirit which we denominate patriotism will prevail, and it is only when the wealth is owned and controlled by the few that there

is danger of a country entering upon a condition of decadence and disintegration which is likely to end in the destruction of government.

As Goldsmith says:

"Ill fares the land, to hastening ills a prey,
Where wealth accumulates and men decay.
Princes and lords may flourish or may fade:
A breath can make them, as breath has made.
But a bold peasantry, their country's pride,
When once destroyed can never be supplied."

THE RELATION OF THE STATE TO AGRICULTURAL INVESTIGATION.

Remarks of Toastmaster.

Ladies and Gentlemen: I regret to announce that General Wiley was unexpectedly called out of the city, and he regretted it very much himself that he had to leave; but while we are unfortunate in one respect in having two absentees upon this program tonight, we are exceeding fortunate in another respect: We have present with us one of the prominent legislators of this state. Ex-Speaker Boxwell is with us tonight. He occupied the exalted position of Speaker of the House of Representatives of this state recently, and I know you will all be glad to hear from him. And I ask him to take the floor and address you upon the subject "The Relation of the State to Agricultural Investigation," or any kindred subject that he desires to speak on.

Response by Hon. Alexander Boxwell.

Mr. Toastmaster, Ladies and Gentlemen: This is the fourth subject that has been assigned to me. I was told that I was to speak on "The Relation of the Legislature to the Ohio Agricultural Experiment Station," and then again on "Scientific Agriculture as Related to the State Legislature," and then late in the night, after I had gone to bed I received a telegram, stating that I was to speak on "Book Farming." I didn't sleep any more that night. I didn't know anything about that topic; and now the Toastmaster gives me something else to speak about.

To judge from the tenor of the speeches already made, or the topics assigned, I guess I won't miss it much if I don't say anything on the topic.

I am glad to be in Wayne county. The chief reason this experiment station was not located in Warren county was that its soil is so fertile they could not experiment on it. Warren county is noted for great

things. We had the great Thomas Corwin in Warren county, and then we have the Hon. Seth Ellis, to whom this Station is much indebted.

Well, about eight years ago, unfortunately, perhaps, for me, and certainly unfortunately for the county, I was sent to the legislature. I didn't know anything about what I was to do in the State Legislature. I didn't know anything about the rules and customs. There was a farmer's caucus of the legislature. I think that Brother Ellis and Brother Brigham suggested to me that I ought to ally myself with that organization. I begged to get in, and they decided, after mature deliberation, to take me in. I learned some things that the agricultual interests of Ohio needed, and, therefore, used what influence I had for their advancement. I am proud of it. I consider my votes in the legislature for appropriations for this institution are the best in my life but one—I mean my legislative life. I always thought and think now that the "Boxwell Law" is the best. When the Board of Control presented their request to the legislative committees and the legislature in general, they found me a willing listener, and I was always glad when the appropriation bill passed if the appropriation for this work was large. I believe it ought to be fostered by the coming legislatures. I would like to have this institution grow so that in a few years it will be, as was said by one of the speakers here this evening, the most important institution in the State of Ohio. I believe it is destined to be that. I think the agricultural interests of the State of Ohio and the other interests of the State of Ohio hinging largely upon agriculture will be better subserved and their value grow. I think the experiments conducted here by the professors, who have devoted their lives to the cause, are worth hundreds and thousands of dollars to the State of Ohio, not only to the farmers, but to those who live in the towns and have small gardens or berry patches to take care of, for they will know what is the right thing to do to succeed in their culture.

I think the Board of Control, who have labored for the success of this institution, ought to be pensioned by and by, for they have not received sufficient remuneration. I would vote for an increase in their salaries.

I think one of the best things in a speech late in the evening is a short speech, when you don't say very much, and don't take very long to say it.

I congratulate myself because I am here. I congratulate you people because this station is located here. I availed myself of the invitation of the Director and of the Board of Control to come here, and I am honored that I came. I believe that this experiment station is going to be of benefit. I thank you.

*A law providing for free admission into high schools of children who pass satisfactory examination in the branches of study taught in common schools.

C. E. T.

THE EXPERIMENT STATION AND THE FARMER.

RESPONSE TO TOAST BY W. I. CHAMBERLAIN, L.L. D.

Owing to the loss by the stenographer of his notes of Dr. Chamberlain's remarks, together with the Toastmaster's introduction, we can give only the abridged report, published by the *Wooster Republican*, as follows:

"The Station and the Farmer" was the topic assigned Hon. W. W. Miller, Secretary of the Ohio State Board of Agriculture, but he could not be present and Dr. Wm. I. Chamberlain, of Hudson, editor of the *Ohio Farmer*, was asked to speak and made one of the wittiest and best speeches of the evening. He said in part:

"I have criticised this Station and parts of its work pretty freely at times and I am, therefore, all the more glad to say just as freely that the more I see of this institution and its workings the less I see in it to criticise and the more to praise. I have visited stations all over the country and read from the reports of what is being done by those in foreign countries, and it is my honest judgment that the actual results being accomplished here and at its several Ohio substations are, on the whole, more extended, covering wider and more varied fields of experimental research than those conducted by any other station in the world, and its equipment is more extensive than can be found anywhere else; while hard, patient, conscientious work is being done to secure still better results. The Ohio Station was started when there were not more than six in the country. It seems to me that the basis of such success in the past and such promise in the future is found in the two words, "permanence" and "continuity." There are exceedingly few changes in its board of trustees and in the working force of experts. Such frequent changes as have occurred in many other state stations have sadly crippled their work. We have had few in this station or in our State University. There is no politics in either institution, and the tenure of office for the professors and experts is not disturbed so long as good work is done. The farmers can best be benefitted by the Station by coming here and seeing for themselves and studying what is being done, so that when they go home they can read the bulletins sent out with an intelligent knowledge of what they mean, and thus be better able to put into practice the advice given."

THE EXPERIMENT STATION AND CONGRESS.

REMARKS OF TOASTMASTER A. D. METZ, ESQ., INTRODUCING HON. J. A. MCDOWELL.

The last regular toast and response of the evening is "The Experiment Station and Congress." I rejoice to be able to present to you tonight a gentleman who hails from that county of rock-ribbed, unterrified, God-fearing Democracy: from that county which had the distinction of being in open rebellion in the war, and of having a Fort Fizzle.* What I want to say to you, my distinguished friend, the Governor, is, that while that county from which this gentleman hails has had that kind of a reputation among some people, yet no county in the State of Ohio, not even old Wayne, sent forth more true and loyal soldiers, in comparison to population with other counties, than did the grand old county of Holmes. She was the first county to erect a monument to the memory of the soldiers of the late rebellion (applause). I know this gentleman whom I am going to present to you tonight feels proud of that county of Holmes; a county that has produced a McDowell, a young man who fills today a position in the Halls of Congress, and who attained that lofty and exalted position by reason of the reward of merit. This gentleman is with us tonight.

I have the honor to present him for us to listen to for a brief space of time, and he will respond to this toast: "The Experiment Station and Congress." The Hon. John A. McDowell, of Millersburg.

RESPONSE BY HON. JOHN A. MCDOWELL.

Mr. Toastmaster, Ladies and Gentlemen: I think that I need not say anything further concerning the county from which I come, because you have already heard so well from the Toastmaster what our county has done, and for what it is particularly noted. I am glad that he mentioned the fact, however, of her loyalty and of the grand record that she has in sending more soldiers into the late civil war than any other county in the State of Ohio in proportion to her population.

At the outset of my remarks I desire to thank the committee of arrangements for the courtesy extended to me, by inviting me to be present and to participate in the exercises of this occasion. The day has been a most enjoyable one. I congratulate the members of the committee and citizens of Wooster upon the grand success of this day's program. It is another evidence of the fact that the people of Wooster make a splendid success of what they undertake.

Ladies and Gentlemen, it will not take much time for me to tell you what I know about the Experiment Station and Congress. There are

*Referring to a rumored attempt at armed resistance to the draft in 1863. C. E. T.

some resemblances, many differences, and certain connections between the two, of which I will briefly speak.

An Experiment Station is a place where it is proposed to accomplish results that will benefit the people at large. The same is, or should be, the purpose of Congress. Both should aim not so much to advance the interests of the individual as to promote the welfare of the individuals collectively. Both are organized, systematized, and work according to plan. An experiment station should have rules and regulations to govern its proceedure; Congress has rules as every new member finds out. An experiment station should have a good strong man to direct its operations; the lower house of Congress has a *big*, *strong* man who manages it. An experiment station is a place to cultivate big heads of wheat and cabbage; Congress is a good place for the big heads of the *genus homo* to be cultivated. The work of both of these institutions is carried on largely according to the principle of division of labor. The labor of the former is conducted under the charge of specialists; that of the latter by special committees. The experiment station aims to give to the public the best results obtainable from the combined wisdom and experience of the past and present ages. Congress is expected to give to the American people the best laws consistent with the motto, "the greatest good for the greatest number." The chief object of experiment stations is to advance agricultural interests. Congress fails to do its duty if it neglects to encourage and foster the agricultural industries of our land, which unquestionably are the foundation stones of all other industries.

A comparison of these two institutions shows more marked differences than resemblances. The operations of an experiment station are carried on with a common purpose in view. The workings of Congress are often conducted at cross purposes. On an experiment farm the work proceeds with great regularity and method. In Congress the work is spasmodic. On the former the *expected* usually happens; in the latter not infrequently the *unexpected* occurs. On the former green things afford a pleasing sight; in the latter green things get into a woeful plight. Experiment farms proceed in the even tenor of their way, exciting neither much condemnation nor justification; Congress moves along under severe public gaze and not a little adverse criticism. On the former, principle controls the movements: in the latter, policy, not principle, too often rules the action.

Experiment stations began to exist in this country independent of any act of Congress. Twenty-two years ago the first station in the United States was begun at Wesleyan University, Middletown, Conn. Soon afterward stations were established in North Carolina and New Jersey. The number rapidly increased, owing to the satisfactory work of the stations. In 1887 there were seventeen stations in fourteen different states. In the same year Congress passed what is called the Hatch Act. This act gives to each state and territory $15,000 a year from the National

Treasury for the support of an agricultural experiment station. Congress presumes that the states will provide land, buildings and other equipments for the stations, and the law therefore provides that the money shall be chiefly expended in carrying on agricultural experiments and investigations and reporting their results. The act outlines quite specifically the work to be done by the stations and covers a great variety of subjects. Agricultural experiment stations are now in successful operation under the act of Congress of March 2, 1887, in all the states and territories. Alaska is the only section of the United States that has no experiment station. Several states have stations maintained by state funds, or funds contributed by individuals. The total number of stations in the United States is fifty-four. In 1896 the income of these stations was $1,133,791,33, of which amount $720,000 was received from the National Government.

Thus it will be seen that Congress has, in the past ten years, been giving substantial support to these institutions. Certainly no one will question the wisdom of such appropriations. Agriculture is so fundamentally related to all other industries and the success of the farming industry is so essential to the welfare of all classes of people that it has been deemed expedient to extend government aid to this industry. I believe that experiment stations can greatly benefit agriculture. They will necessarily make farming a more complex occupation and therefore require that the farmer of the future shall have greater scientific knowledge. But this means progress, higher thinking, higher living. The farmer of the nineteenth century, in order to be a successful farmer of the twentieth century, must know the best methods and principles of agriculture. He cannot experiment and investigate for himself, but he must practice the well established principles of other investigators. The experiment station has been established to do this work for the farmer. It is its duty to point out to the farmer the best methods to pursue in his vocation. If it accomplishes its true object, it will confer a great benefit not only upon the farming class but upon other classes as well.

The work of experimentation and investigation is necessarily expensive. But the results obtained are often invaluable. This work can best be carried on through government aid, state or national. The work will be done with less expense, it will be done more promptly, it will be done more thoroughly and the results will be farther reaching.

I congratulate the citizens of Wayne county upon the honor and advantage you enjoy of having the Ohio Experiment Station situated in your beautiful county. Since it is not in my own county, I am very glad that it is in a neighboring county. It is an honor of which you may justly be proud to have one of the best experiment stations in the Union in your county. It is an advantage to every farmer, business man, and professional man, which I am sure you recognize and appreciate.

The people of Ohio and especially the management of this Station are to be congratulated that this institution is situated in the midst of a

people who appreciate and encourage a good thing. I was greatly impressed by the significant statement made by your distinguished guest, Governor Bushnell, when he referred to Wooster's fine educational institution,* so beautifully situated in the northern part of your city, and then opposite it the beautiful Experiment Station no less advantageously situated. Fortunate indeed are you to have these two grand institutions right at your doors. It means much for the future of Wayne county and the State of Ohio. For years, Ohio's strength and prominence have been due largely to her sturdy, industrious and intelligent farmers. From the combined influences of such institutions as you haye here it is reasonable to expect to see Ohio easily stand in the front rank of great agricultural states.

The Ohio farmers are all to be congratulated upon what this Station has done for them and what it promises to do. The different departments of the Station are in charge of men eminently fitted for their special work. It has been my privilege to become personally acquainted with several of the professors and I have found them thorough,earnest and practical in the work. This Station is most worthy of our hearty encouragement and support. Let us give it the aid and praise that it merits. The persons who are doing the work there are human, and like other human beings, their efforts will be the better when they are properly appreciated. Let us remember that the work done at this Station is to be for the welfare of the farmer. Let us look carefully to the interests of the Ohio farmers. Their success means our success.

My friends, we shall do well to have Ohio's fame rest not only on her ability and distinction to furnish presidents for the Union, but also on the intelligence, progress and well-merited success of her farmers.

I thank you again for the pleasure I have enjoyed of being present today and I hope that the Station that is now situated upon the hill south of the city may be fully appreciated by the citizens of this county, by the citizens of the State, and that every person, no matter what his position is, may give it the encouragement and the support that it deserves; that Ohio may hold a prominent place in the agricultural interests of this great country of ours.

*The University of Wooster.

APPENDIX B.

BULLETIN

OF THE

Ohio Agricultural Experiment Station

1897.

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